# WORLD PETROLEUM REPORT

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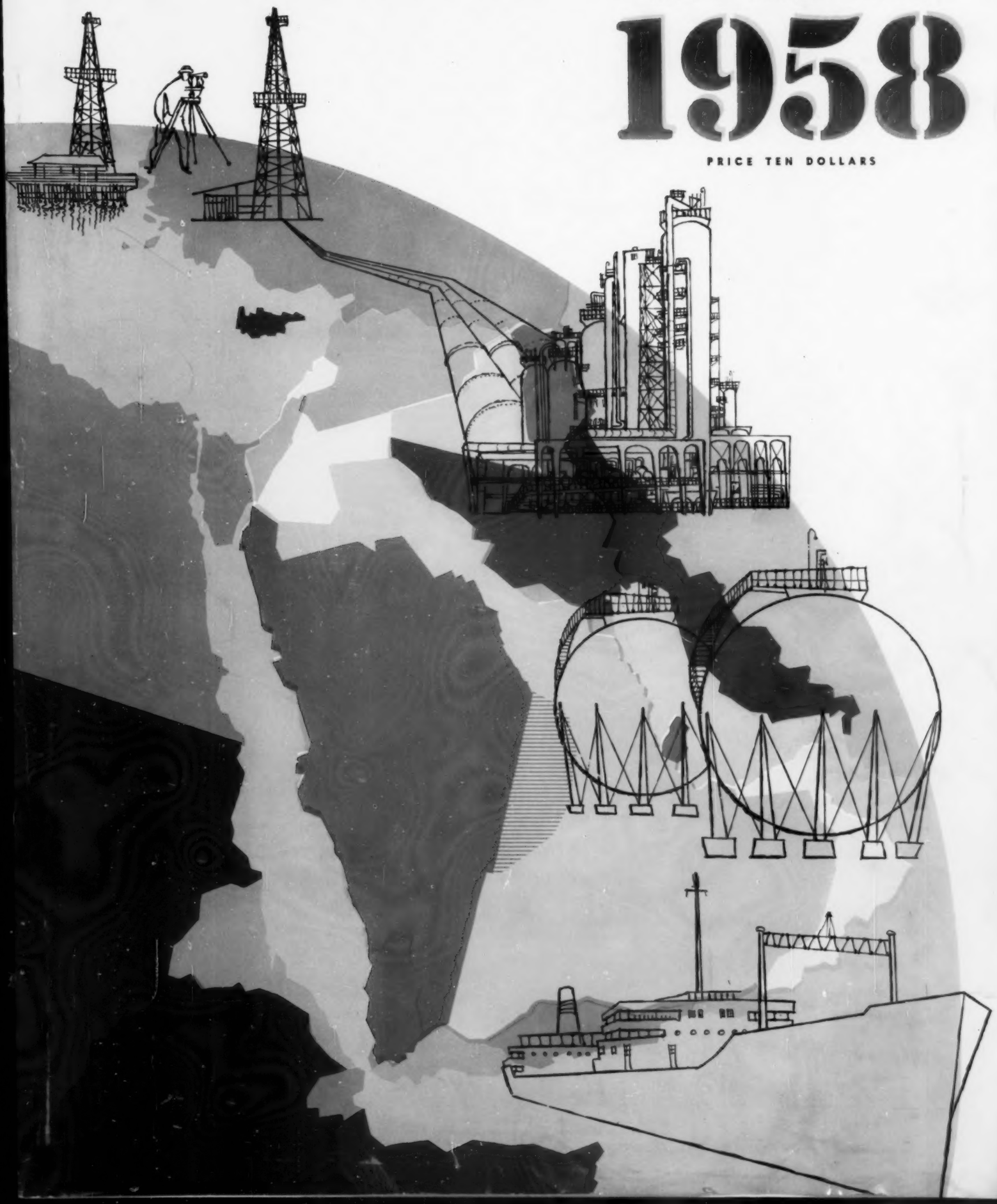
# 1958

PRICE TEN DOLLARS



## BJ POWER TOOLS

Byron Jackson makes the most complete line of air-powered and hydraulic-powered tools in the industry.

BJ POWER SLIP...side-opening feature allows slip to be placed around pipe or removed without stripping over pipe. Unitized slip assemblies provide quick change to handle all drill pipe and casing sizes from 2⅜" through 7" (13⅜" with accessory casing bowl) and up to 300 tons.

BJ POWER TUBING SPIDER...choice of 50- or 75-ton capacity, air- or hydraulic-powered, for 2⅜", 2⅞" and 3½" O.D. tubing. Remote-control foot pedal pressure-raises and pressure-sets slips.

BJ POWER TONGS...BJ Powairmatic (air-powered) Tubing Tong is the world's leading power tong; handles pipe sizes up to 4½" O.D. Hydratorc is hydraulic-powered version, available in two models, "S" (Standard) and "R" (reversible without rolling over). BJ Combination Spinning and Makeup Tong in air or hydraulic models accents safety and convenience by elimination of spinning chain.

**BJ RED IRON...**

tools for the oil industry

## BJ TONGS

Byron Jackson Tongs, available in 14 different types and a range of sizes to handle any size pipe, are especially popular with field crews because of their perfect balance and easy handling. *There are more BJ Tongs in use than any other make!*

Constructed of heat-treated alloy steel and precision machined, BJ Tongs provide longer wear and easier operation.

A feature of BJ Tongs is the superior BJ Gooseneck hanger, which provides quick lateral and longitudinal adjustment for perfect balance.

Standard lubrication fittings are placed in protected recesses, permitting use of large-diameter solid hinge pins not weakened by lubrication holes. Hinge pin holes are flame-hardened to prevent elongation.

## OTHER BASIC BJ EQUIPMENT

- BJ Casing Spider
- BJ Casing Bowl
- BJ Kelly Bushings
- BJ Unitized Hand Slips
- BJ Wall Scratchers
- BJ Casing Centralizers
- BJ Slip Inserts
- BJ Tong Dies
- BJ Centrifugal Pumps
- PB Mud Guns

*Ask your BJ field representative today for more detailed information on these and other BJ tools.*

## BJ HOOKS

Byron Jackson makes the only *complete* line of hooks for oilfield operations—drilling and producing. BJ developed the Triplex Hook design, now the standard of the industry. *There are more BJ Hooks in use today than any other make!*

BJ HYDRAPLEX HOOKS...new improved design features hydraulic snubber and exclusive nook positioner. Capacities: 100, 150, 250, 350, and 500 tons.

BJ UNIMATIC HOOKS...have BJ "Big Hook" features, yet provide shortest overall length unitized with block. Capacities: 40, 75, 100, 150 and 250 tons.

BJ TUBING and ROD HOOKS...proved in service. Tubing Hooks, 30, 50 and 75 tons; Rod Hooks, 10, 15 and 20 tons.

## BJ ELEVATORS

Byron Jackson offers 40 different elevator types in 280 sizes—the most complete line in the industry.

BJ SLIP ELEVATOR-SPIDER...500-ton capacity, for deepest holes and heaviest casing programs. May be used as either elevator or spider.

BJ SLIP CASING ELEVATORS...for 4½" through 13⅜" casing runs. Side door up to 200-ton capacity; center latch, 75-ton capacity.

BJ SIDE DOOR ELEVATORS...available in a complete range of sizes and capacities for drill pipe, casing and tubing; slip type or collar type.

BJ CENTER LATCH ELEVATORS...available in a wide range of sizes and capacities for drill pipe, casing and tubing ...slip type or collar type.

## OIL FIELD RUBBER PRODUCTS

Byron Jackson's PB Rubber manufacturing facilities have been producing superior oilfield rubber products for more than 25 years. PB does its own compounding and processing, and operates its own laboratory to maintain high quality standards.

PB PROTECTORS AND STABILIZERS...available in Stretch-On and Safe-Lok types. PB Protectors and Stabilizers are easily installed, grip the pipe firmly and provide maximum wear. Both types may be had in oil-resistant rubber. PB Polar Protectors are available for use in severe cold.

PB PIPE WIPERS...flat, oval, tandem—there is a PB Pipe Wiper for every drilling purpose. Flexible webs permit oversize members of the string to be pulled through safely. Available in oil-resistant rubber. Wipers are also available for kellys, tubing and sucker rods.

PB WIRE LINE GUIDES...absorb dangerous whip, lash and traveling waves in the drilling line, prevent excessive wire line wear, uneven line spooling and pile-up, and protect the fast sheave of the crown block. Two types, standard and roller, utilize same principle to damp vibration.

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## JOHNSTON TESTERS, INC.

**first in drill stem testing**

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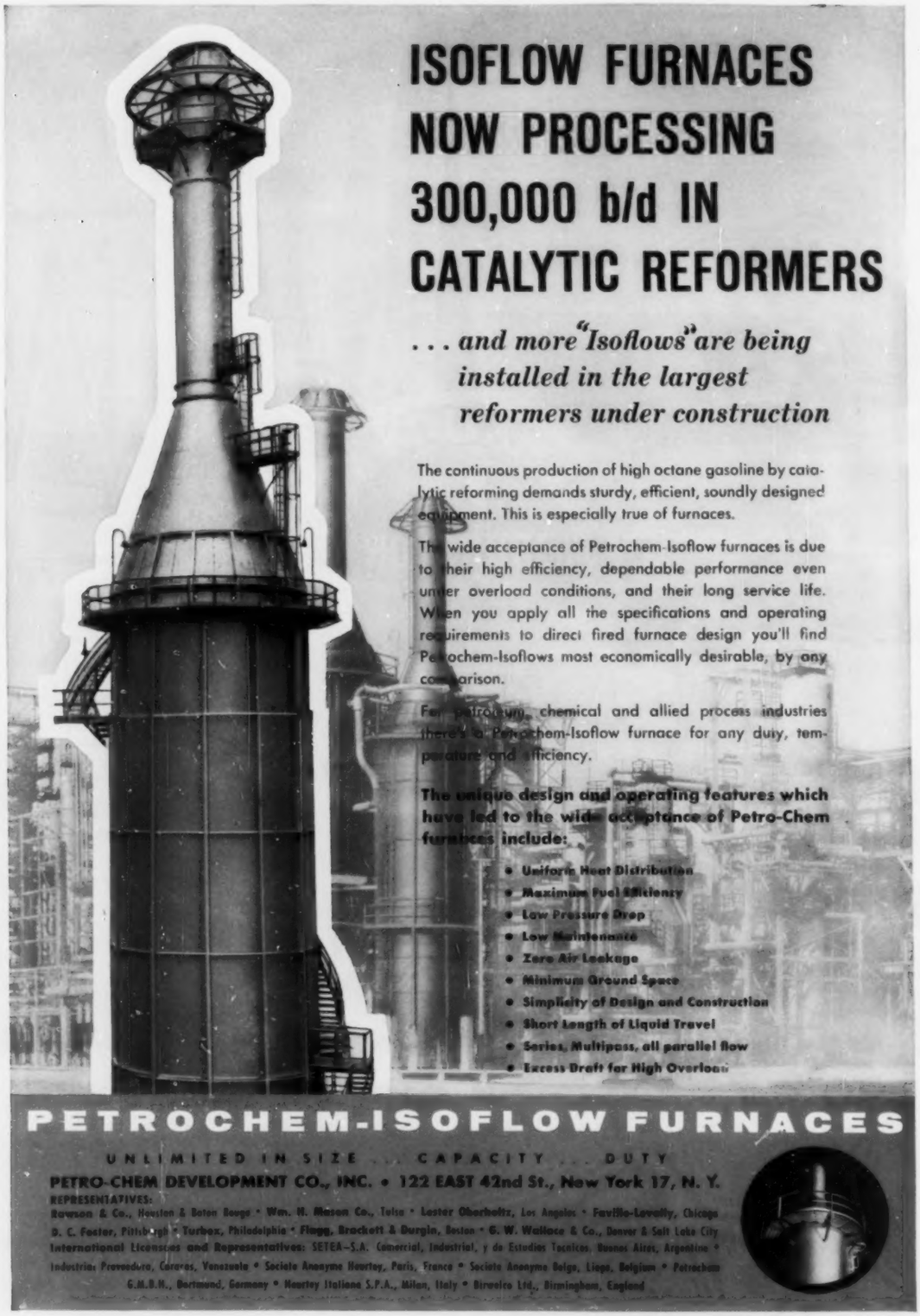

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The continuous production of high octane gasoline by catalytic reforming demands sturdy, efficient, soundly designed equipment. This is especially true of furnaces.

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For petroleum, chemical and allied process industries there's a Petrochem-Isoflow furnace for any duty, temperature and efficiency.

**The unique design and operating features which have led to the wide acceptance of Petro-Chem furnaces include:**

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- Short Length of Liquid Travel
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Fig. 3466 Horizontal Triplex Plunger Pump. Maximum speed, 250 RPM. Maximum capacities and pressures: 91 barrels per hour at 1180 PSI; 179 barrels per hour at 600 PSI. Write for 1958 catalog.

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We experimented a long time—and found, when the returns were in, that we got more of what we want in Gaso Pumps. More in adaptability to various conditions. More in day-in and day-out dependable performance. More in operating and maintenance economy, and more in service life. That, in a nutshell, is why we wrote GASO into our standard pump specifications, and why we consider the policy a short cut to the results we want in pumping service.

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**On offshore sites, from Venezuela to the Persian Gulf and to Borneo, Paxman drilling engines are giving unfailing service on platform and tender, proving once again that they are the answer to the driller's need for flexible and dependable power.**

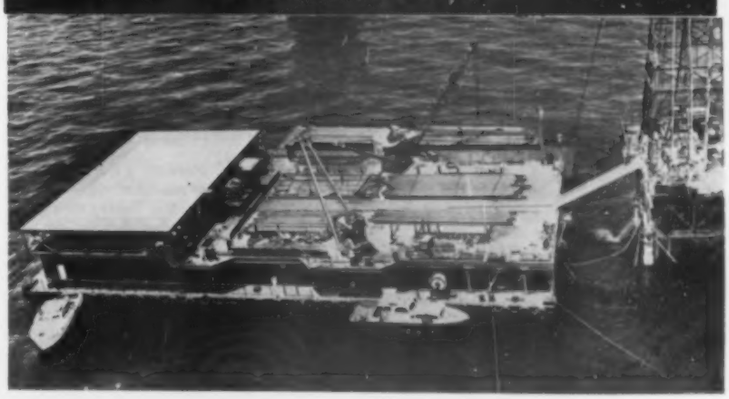
**SIX MILES OFFSHORE IN THE GULF OF PARIA:** National-OWECo type Ideal 50 drawworks with two National-OWECo size C.350 slush pumps powered by four Paxman "Package" sets of 1,600 total continuous shaft horsepower.

Owners: Trinidad Northern Areas Ltd.
Operators: The United British Oilfields of Trinidad Ltd.

**ABOARD BARGE G.P.5 ON LAKE MARACAIBO:** Illustrated at foot of page, three National-OWECo size E.500 slush pumps powered by four Paxman "Package" sets of 1,468 continuous total shaft horsepower. Two more Paxman engines drive 250kVA alternators, for power and lighting.

Owners & Operators: Compania Shell de Venezuela.

## PAXMAN DIESEL ENGINES FOR OILFIELD DUTY



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70% interchangeability of wearing parts.

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*Petroleum Industry Consultants C.A., operating in Maracaibo and Caracas, carry full stocks of spares for Paxman engines.*

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J.31.

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**BAKER**
**OIL TOOLS, INC.**
HOUSTON
LOS ANGELES
NEW YORK

**PRODUCTION APPLICATIONS**

**SINGLE ZONE** Normal Completion

**SINGLE ZONE** Permanent Type Well Completions

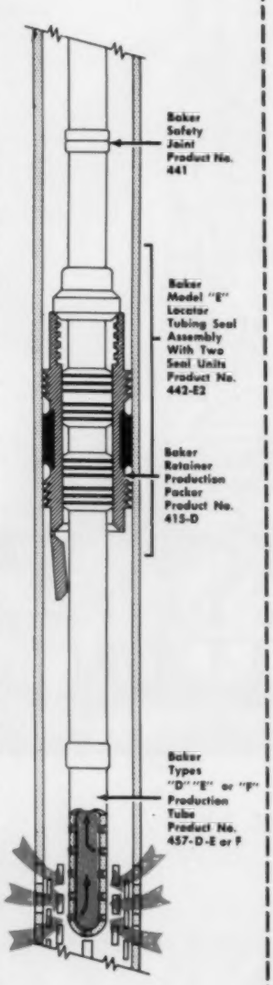
Baker Retainer Production Packer Product No. 415-D

## FEATURES

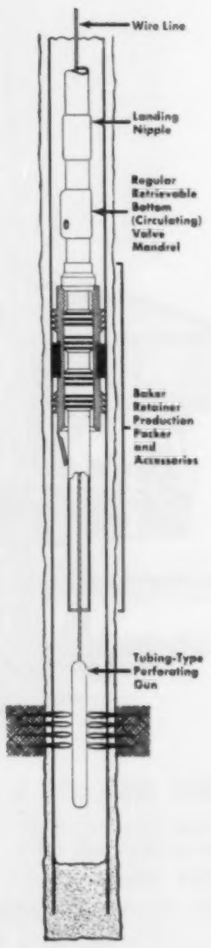
Holds any pressure from either above or below that is safe for the casing, even under temperatures in excess of 300°F.

Pack-off is independent of set-down weight or tension. Tubing string is free; just pick up (or unlatch and pick up) to remove it.

Use it as a squeeze and testing tool or as a temporary or permanent bridge plug in conjunction with any production application.

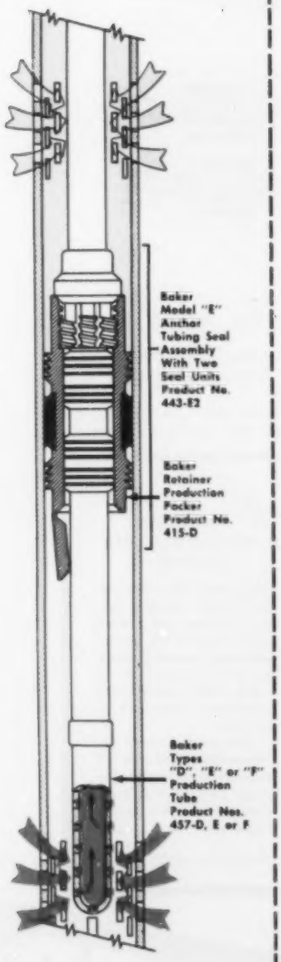

Baker Safety Joint Product No. 441
Baker Model "E" Locator Tubing Seal Assembly With Two Seal Units Product No. 442-E2
Baker Retainer Production Packer Product No. 415-D
Baker Types "D" "E" or "F" Production Tube Product No. 457-D-E or F

Illustrates Packer set in casing with Locator Tubing Seal Assembly and Production Tube installed for single-zone production.



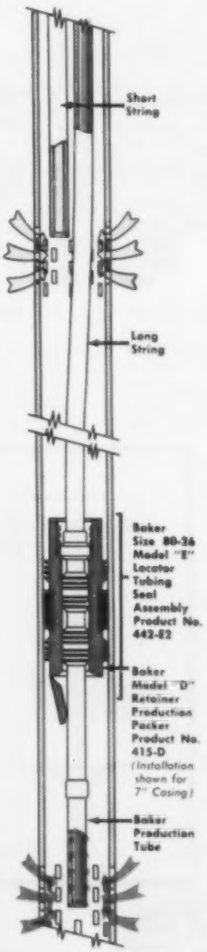

Illustrates typical Permanent-Type Well Completion Hook-Up showing perforating operation through and below the Packer.

**DUAL ZONE**
Normal Completion


Baker Model "E" Anchor Tubing Seal Assembly With Two Seal Units Product No. 443-E2
Baker Retainer Production Packer Product No. 415-D
Baker Types "D", "E" or "F" Production Tube Product Nos. 457-D, E or F

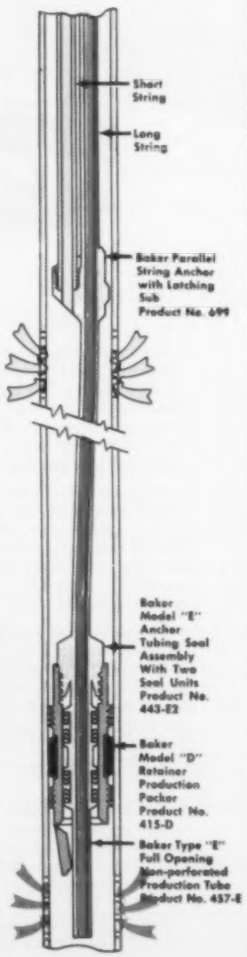
Illustrates Packer set in casing, with anchored production string for dual-zone production. Tubing can be released from Packer by rotating to right.

**DUAL ZONE**
Parallel String
Short String
Hanging Free


Short String
Long String
Baker Size 80-36 Model "E" Locator Tubing Seal Assembly Product No. 443-E2
Baker Model "D" Retainer Production Packer Product No. 415-D (Installation shown for 7" Casing)
Baker Production Tube

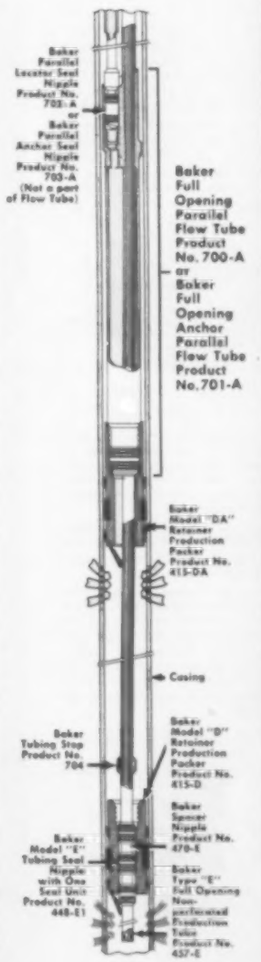
Permits removal of either string independently of the other regardless of sequence. Full-Opening (Tubing I.D.) Long String to lower zone.

**DUAL ZONE**
Parallel String
Short String
Anchored


Short String
Long String
Baker Parallel String Anchor with Latching Sub Product No. 699
Baker Model "E" Anchor Tubing Seal Assembly With Two Seal Units Product No. 443-E2
Baker Model "D" Retainer Production Packer Product No. 415-D
Baker Type "E" Full Opening Non-perforated Production Tube Product No. 457-E

Permits removal of either string independently of the other, however long string must be run first. Short string pulled first. Full-Opening (Tubing I.D.) Long String.

**DUAL ZONE**
Parallel String
Two-Packer Hook-up

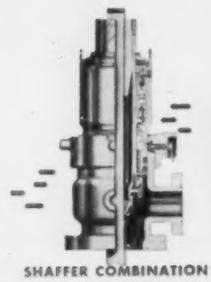

Baker Parallel Locator Seal Nipple Product No. 703-A or Baker Parallel Anchor Seal Nipple Product No. 703-A (Not a part of Flow Tube)
Baker Full Opening Parallel Flow Tube Product No. 700-A or Baker Full Opening Anchor Parallel Flow Tube Product No. 701-A
Baker Model "DA" Retainer Production Packer Product No. 415-DA
Casing
Baker Tubing Stop Product No. 704
Baker Model "D" Retainer Production Packer Product No. 415-D
Baker Spacer Nipple Product No. 470-E
Baker Model "E" Tubing Seal Nipple with One Seal Unit Product No. 448-E1
Baker Type "E" Full Opening Non-perforated Production Tube Product No. 457-E

Illustrates Two-Packer parallel string installation with each zone confined to its individual tubing string with full-opening to lower zone for use of all permanent-type completion tools.

# When it comes to pressure control...

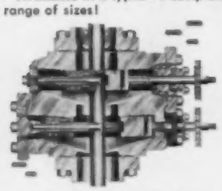
# Come to SHAFFER!

**Shaffer pressure control equipment is the top choice of leading operators throughout the Oil World because Shaffer equipment embodies unique advancements found in no other line of pressure control equipment... advancements that assure easier, more positive operation and quicker, simpler servicing. Add to this the fact that Shaffer is quality equipment throughout, built to the highest standards of safety, long life and low maintenance... and is available in a choice of sizes, and types to meet virtually every field condition and pressure requirement... and you will see why Shaffer leads the industry in pressure control. Take these typical products, for example...**



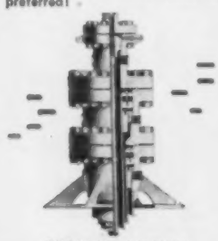
## SHAFFER COMBINATION ROTATING BLOWOUT PREVENTERS AND STRIPPERS

- Combine in one unit every necessary feature for complete pressure control while drilling.
- Maintain continuous seal around any element in the drill string, drill pipe, tool joints, kellys, drill collars, and couplings—*automatically*, whether string is rotating, being raised or lowered, or is stationary.
- Can be used with any standard kelly (square, hexagonal or octagonal)—and any type of drill pipe (coupled, upset or flush). No special drill string is required!
- Quick-Releasing Bonnet permits passing bits, reamers, other large-diameter tools through the unit quickly and easily.
- Available in 2 types—a complete range of sizes!



## SHAFFER MECHANICAL CELLAR CONTROL GATES

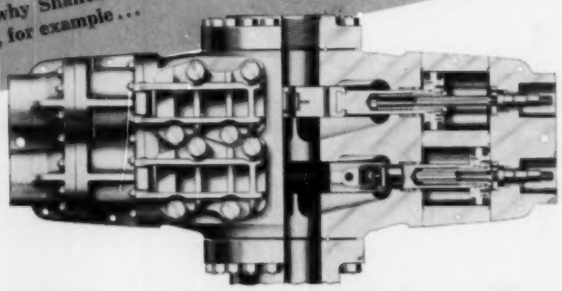
- Available in both *Double* (illustrated above) and *Single* types for operation by an air motor drive utilizing the air supply available at most rigs—*plus the protection of manual standby!*
- Even in sizes as large as 13⅜" (12" Series 900) the Double type requires less than 29" cellar height, the Single less than 17½"!
- Rams are changed by simply removing one end cover... quick draining ram compartments prevent accumulation of deterimental mud and sand... many other unique features make these gates top choice wherever *mechanically*-operated cellar control gates are preferred!



## SHAFFER LANDING, CASING AND TUBING HEADS

- Meet every requirement for modern, compact, casing and tubing suspension in wells of all depths.
- Available in various types and packing arrangements. Base Heads and Combination Base, Casing and Tubing Heads are available for combining several units into one where space is at a premium.

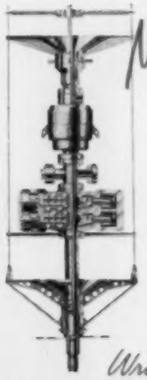
*Shaffer also provides a complete line of modern Tubing Heads, Multiple Zone Hook-Ups and other control equipment for your landing, casing and tubing strings.*



## SHAFFER HYDRAULIC CELLAR CONTROL GATES

- Available in Both *Double* (illustrated above) and *Single* types. Both in choice of *Non-Rising* Locking Shafts (for those preferring maximum compactness) and *Rising* Locking Shafts (for those preferring quick indication of ram position.)
- They provide unequalled simplicity in changing rams. Simply unbolt two doors, change rams, close and bolt the doors. Rams are automatically aligned as the doors are bolted shut!
- They save cellar space. Even in sizes as large as 13⅜" (12" Series 900), the Double Gate (with *two* ram compartments in *one* body) is only 30" high...and the Single only 18½" high (Smaller sizes are even less)!
- Still other exclusive features—such as Direct Hydraulic Drive, Completely Enclosed Design, Quick-Draining Compartment Bottoms...make Shaffer Hydraulic Cellar Control Gates the outstanding choice of the industry.

*They are available in a complete range of sizes and pressure ranges.*



*New!*

## SHAFFER SUB-SEA DRILLING EQUIPMENT

The latest Shaffer advancement. Enables sub-sea drilling and testing operations to be carried out from low-cost floating vessels instead of the costly drilling islands and platforms heretofore required.

This revolutionary development is sweeping the industry. A special twelve page bulletin has been prepared describing this equipment.

*Write for your free Copy*

**IN ADDITION,** Shaffer provides the industry's most advanced line of Adjustable Flow Beans—the units that pioneered the adjustable flow bean principle and are still unequalled in efficiency. They are available with Conical, Micro and electrically-heated Thermo Tips, in both regular and hard-metal designs to meet a wide range of drilling, production and refinery applications. Both flanged or screwed connections—in a wide choice of popular sizes!

***Send for the complete Shaffer Catalog which describes these and other Shaffer Pressure Control Products!***

34 year OF OIL TOOL LEADERSHIP

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HOUMA, LOUISIANA, Shaffer Tool Works, Post Office Box 827
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# Foreword

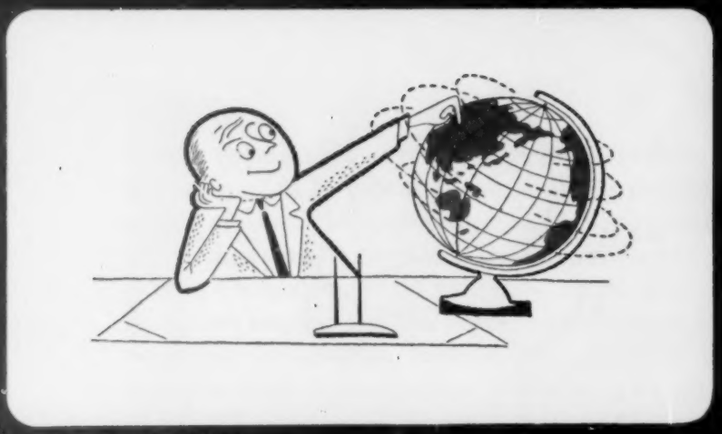
*The purpose of this volume is to present a balanced appraisal of oil developments in all major countries of the world. To facilitate comparison, each section is divided into three parts: (1) Physical Development, including exploration developments, production levels, etc.; (2) Oil Laws; and (3) National Factors, including tax rates, attitude toward investors, etc. It should be borne in mind that, to conserve space, information in the 1957 edition is not repeated. Only changes are noted, and resultant space savings have been devoted to new country reviews which were not covered in the 1957 edition.*

*For the next few years the international oil industry must live with the hard fact of excess producing capacity in all major producing areas—a complete reversal from a year ago when oil needs everywhere appeared to be running far ahead of production. The major reasons behind this new surplus are: (1) The Suez crisis which set consumption back by about a year; and (2) a general economic slowdown in most parts of the world.*

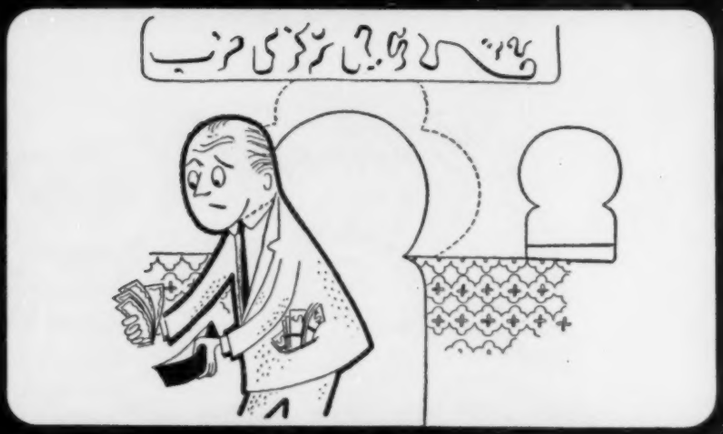
*Similar crises have been faced by the oil industry many times before, and eventually have worked themselves out. With restraint on the part of major producing companies, demand continued its long-term rise and eventually caught up with supply. Now, a new factor is appearing. For the first time the so-called "independent" or smaller companies are suddenly becoming big internationally. Oil available to the independent internationals is now about 200,000 barrels per day—and it will increase to about one million b/d, by 1965. If a really major discovery is made it would make the total much larger. These new companies are subject to government pressures to increase production as much as possible, but they are less able to resist such pressures than the major oil companies. Their financial resources are smaller, and they must recoup some of the tremendous investment attendant on international oil finding without delay.*

*This situation could easily become the principal world oil problem of the coming decade. If the international oil fraternity does not exercise restraint, and develop world oil production commensurately with its needs, the alternative may be duplication on a world-wide scale of the United States' catastrophic experience with 10-cents-per-barrel oil of the 1930's. The decision rests in the hands of the governments and producing companies around the world. With faith in their good judgment and common sense, we respectfully dedicate this issue to them.*

*Gordon H. Brown*



THINKING OF PUTTING UP A PLANT, REFINERY OR MILL ON FOREIGN SOIL?



UNFAMILIAR CURRENCY MAY TANGLE UP YOUR FINANCES

AND NOT KNOWING THE LOCAL UNION RULES
CAN GET YOU INTO HOT WATER

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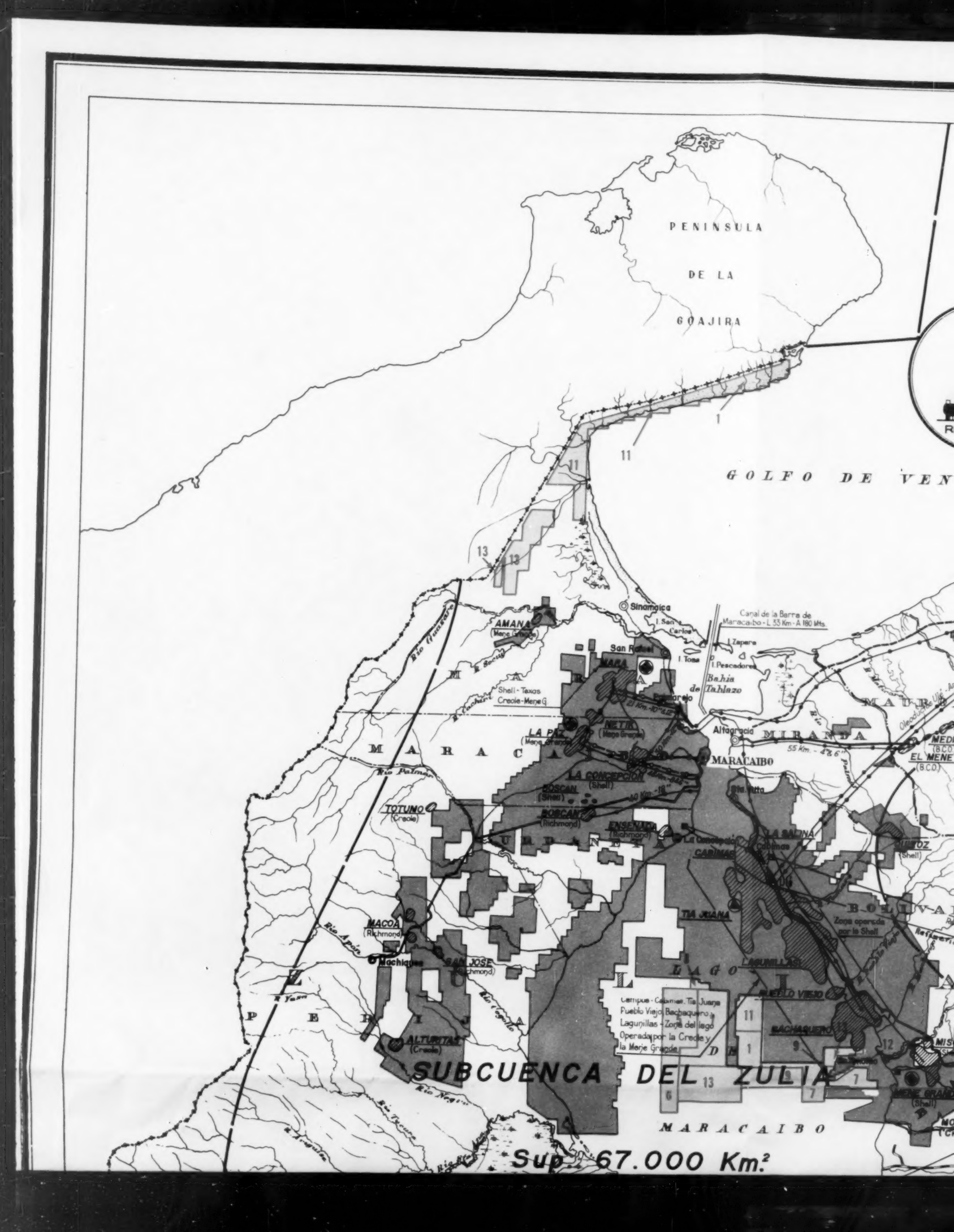
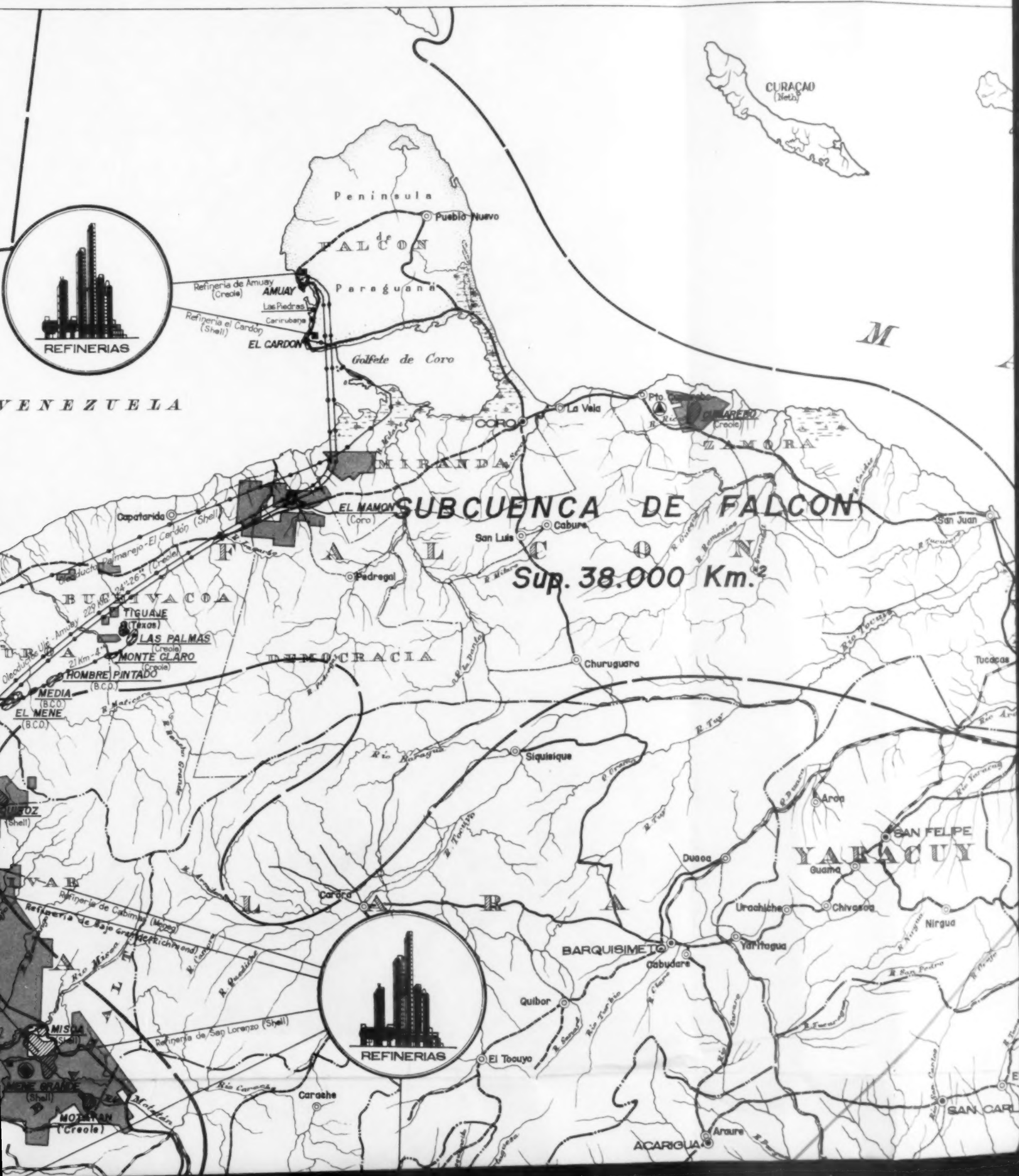
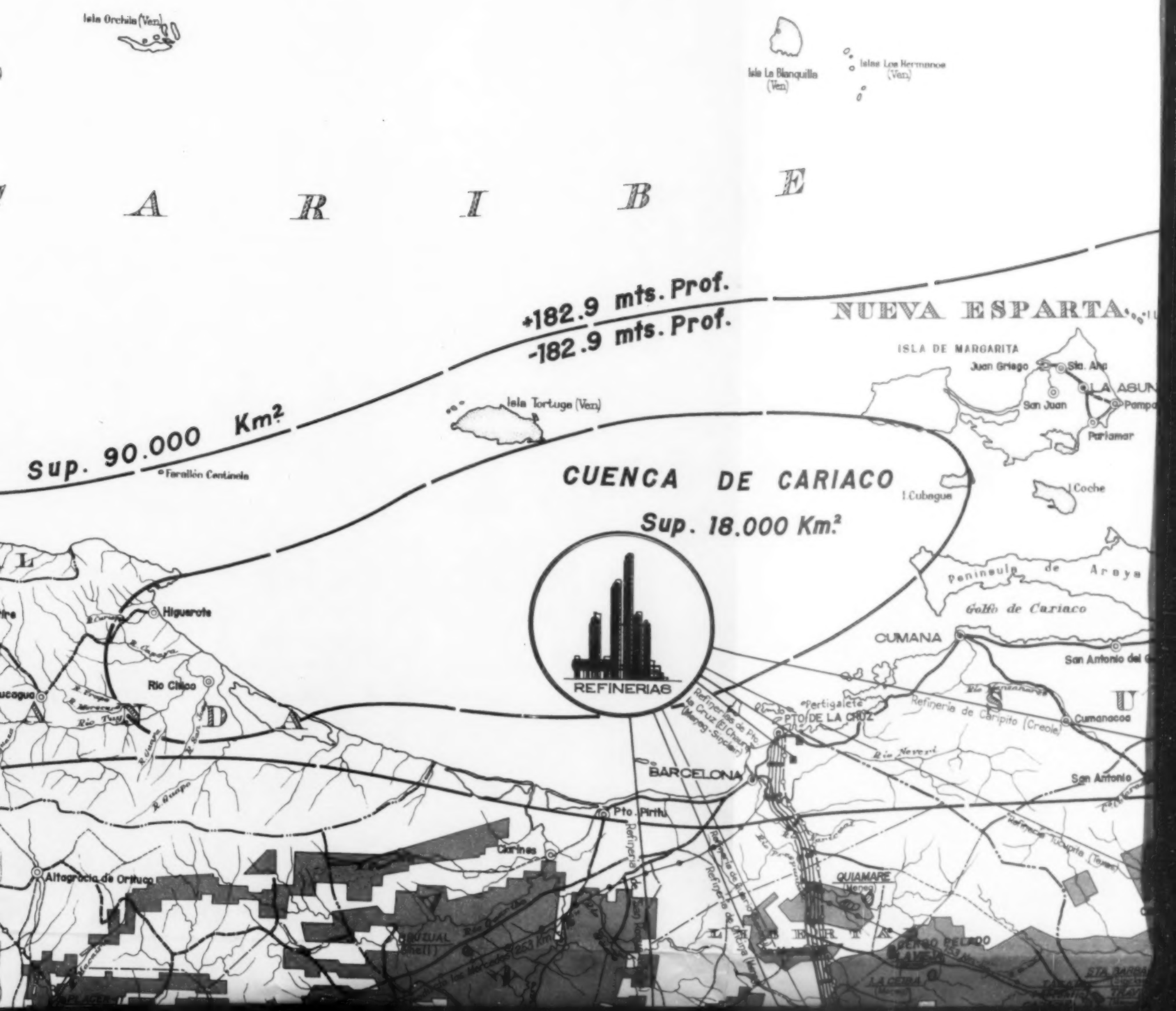
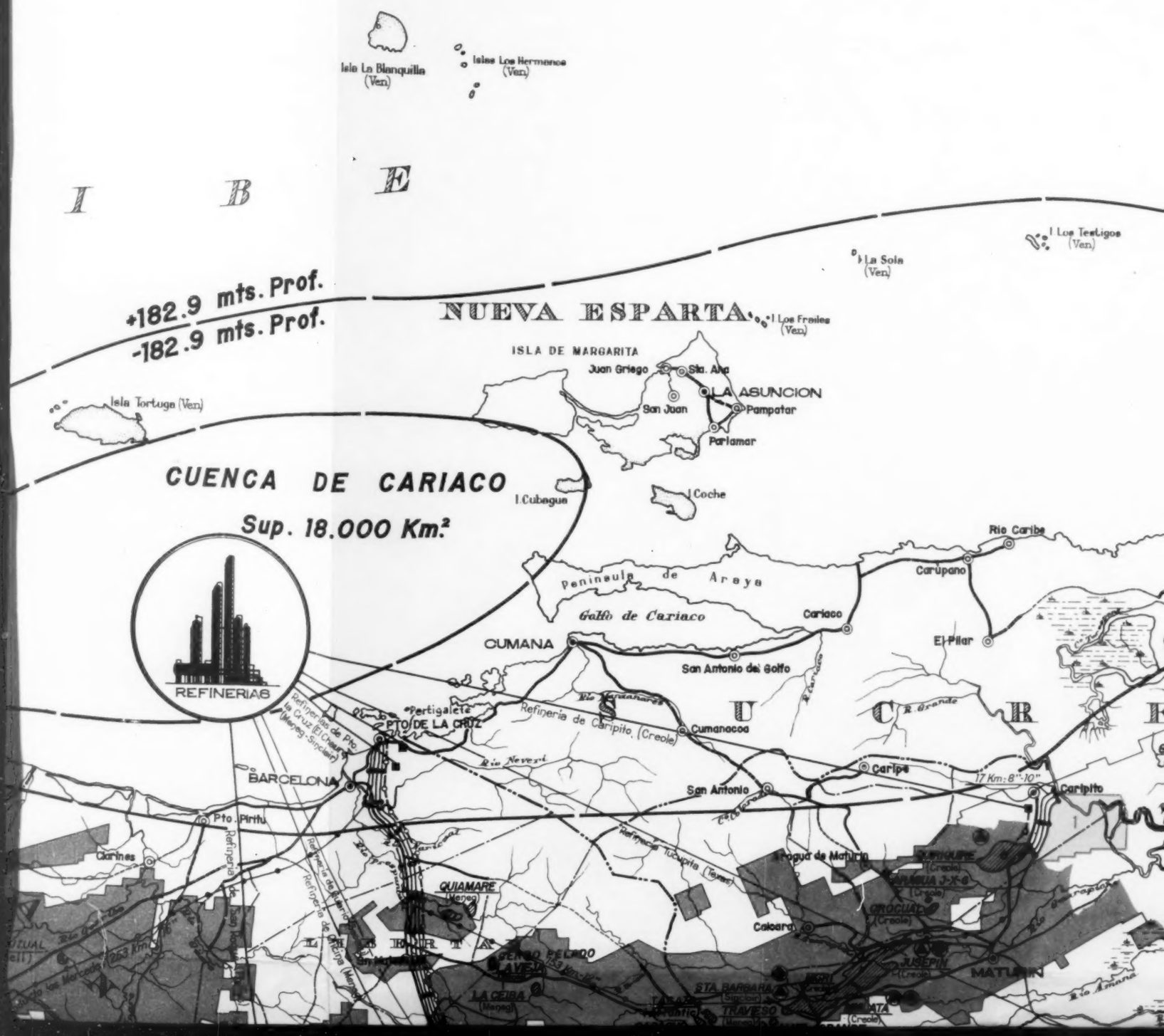

PENINSULA
DE LA
GOAJIRA
GOLFO DE VEN
Sinamaica
Canal de la Barra de Maracaibo - L 53 Km - A 180 Mts.
AMANA
(Merey Grande)
San Rafael
MARA
Shell - Texas
Creole - Merey G.
Altagracia
MIRANDA
MARACAIBO
LA PAZ
(Merey Grande)
NETIA
(Merey Grande)
LA CONCEPCION
(Shell)
BOSCAN
(Shell)
BOSCAN
(Richmond)
TOTUMO
(Creole)
ENSENADA
(Richmond)
CABIMAS
LA SALINA
(Cabimas)
TIA JUANA
LAGUNILLAS
PUEBLO VIEJO
BACHAQUERO
MACOA
(Richmond)
Machiques
SAN JOSE
(Richmond)
ALTURITAS
(Creole)
Campos - Cabimas, Tia Juana
Pueblo Viejo, Bachaquero y
Lagunillas - Zona del lago
Operados por la Creole y
la Merey Grande
SUBCUENCA DEL ZULIA
MARACAIBO
Sup. 67.000 Km.²


CURAÇAO
(Neth.)
Península de FALCON
Paraguaná
Pueblo Nuevo
Refinería de Amuay (Creole)
AMUAY
Las Piedras
Carirubana
Refinería el Cardón (Shell)
EL CARDON
REFINERIAS
Golfete de Coro
VENEZUELA
CORO
La Vela
Pto
CUMAREBO (Creole)
ZAMORA
MIRANDA
EL MAMON (Coro)
SUBCUENCA DE FALCON
Sup. 38.000 Km.²
Capatarida
San Luis
Cabure
San Juan
Pedregal
BOLIVACOA
TIGUAJE (Texas)
LAS PALMAS (Creole)
MONTE CLARO (Creole)
HOMBRE PINTADO (B.C.O.)
MEDIA (B.C.O.)
EL MENE (B.C.O.)
DEMOCRACIA
Churuguara
Tucacas
Siquisique
Aroa
SAN FELIPE
YARACUY
Duaca
Guama
Urachiche
Chivacoa
Nirgua
Yaritagua
BARQUISIMETO
Cabudare
Carora
Quibor
El Tocuyo
Refinería de Cabimas (Mene)
Refinería de Bajo Grande (Richmond)
Refinería de San Lorenzo (Shell)
MISOA (Shell)
MENE GRANDE (Shell)
MOTATAN (Creole)
Carache
ACARIGUA
Araure
SAN CARL
REFINERIAS

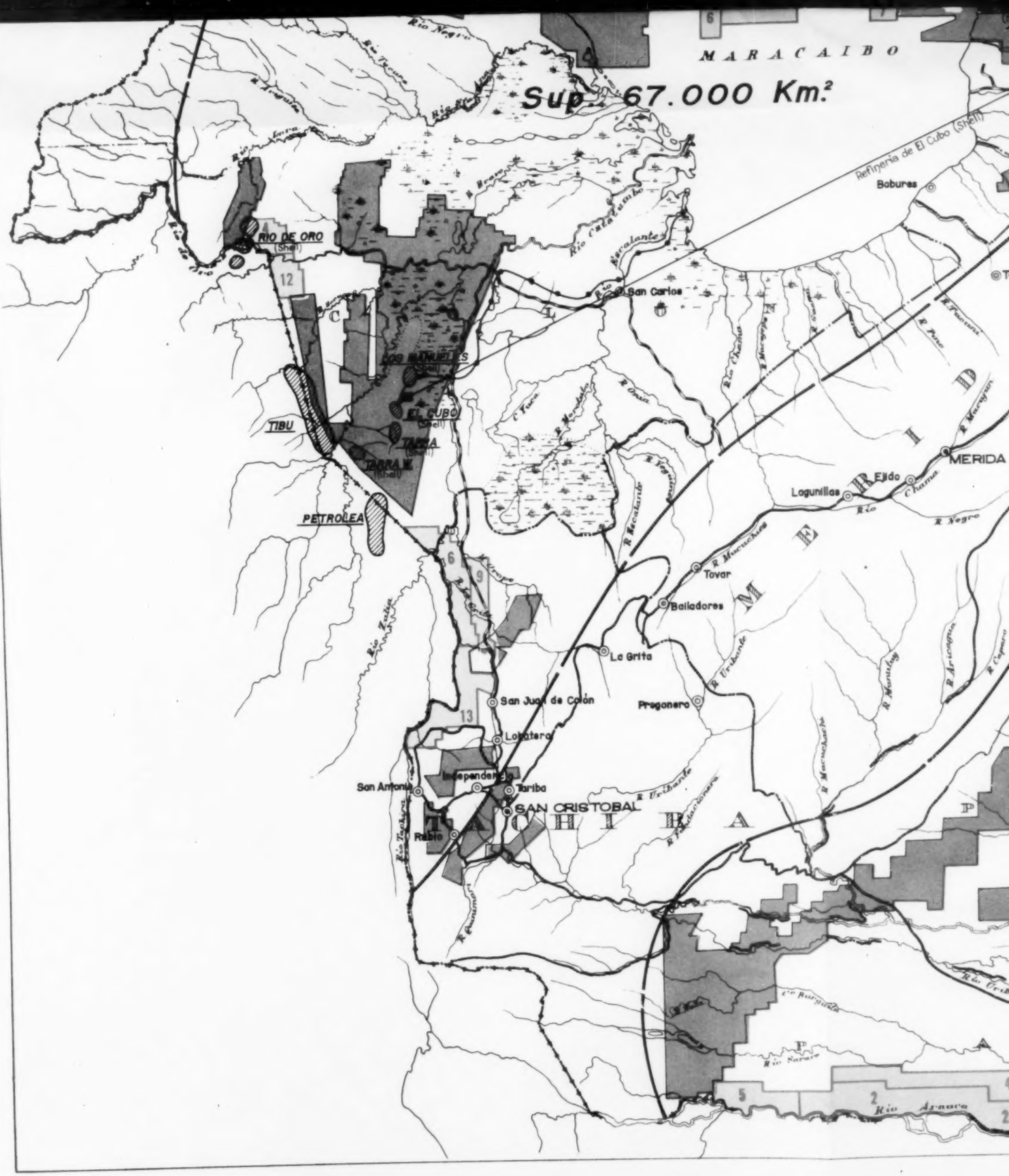
CURAÇAO
(Neth)
BONAIRE
(Neth)
Isla de Aves (Ven)
Islas de los Roques (Ven)
M A R
C
PLATAFORMA CONTINENTAL
Su
FALCON
San Juan
Tucacas
Golfo Triste
Pto. Cabello
Turiamo
Oleoducto Catia de la Mar-Caracas
Maiquetía
La Guaira
Macuto
FEDERAL
DTO
CARACAS
Petare
Guarenas
Guatire
LOS TEQUES
MARACAY
Turmero
La Victoria
Sta Lucía
Caucagua
MIRANDA
Cúa
Ocumare del Tuy
ARAGUA
Aroa
SAN FELIPE
YARACUY
Guama
Urachiche
Chivacoa
Yaritagua
Nirgua
Montalbán
Bejuma
CARABOBO
VALENCIA
Guacara
Lgo. de Valencia
Güigüe
Villa de Cura
San Casimiro
San Sebastián
SAN JUAN DE LOS MORROS
Tinaquillo
El Tinaco
SAN CARLOS
El Pao
Rio Tocuyo
Rio Aroa
Rio Yaracuy
R. Nirgua
R. San Pedro
Rio San Carlos
Rio Pao
Rio Chirgua
Rio Guarico
Rio Memo

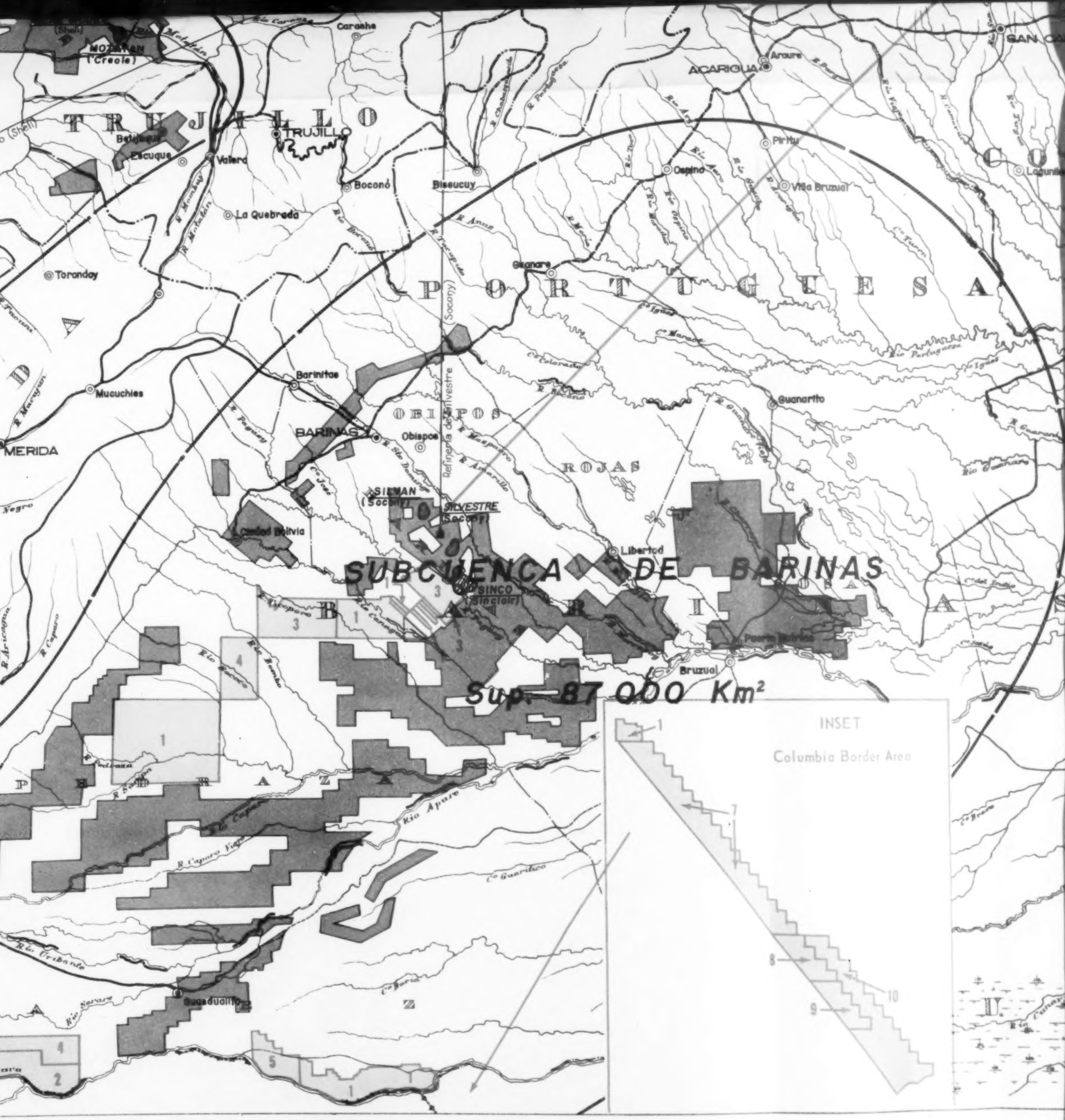

Isla Orchila (Ven.)
Isla La Blanquilla (Ven.)
Islas Los Hermanos (Ven.)
A R I B E
+182.9 mts. Prof.
-182.9 mts. Prof.
NUEVA ESPARTA
ISLA DE MARGARITA
Juan Griego
Sta. Ana
San Juan
Pampatar
Porlamar
Isla Tortuga (Ven.)
Sup. 90.000 Km²
Farallón Centinela
CUENCA DE CARIACO
Sup. 18.000 Km.²
I. Cubagua
I. Coche
Península de Araya
Golfo de Cariaco
CUMANA
San Antonio del G
Higuerote
Río Chico
REFINERIAS
Refinería de Pto. la Cruz (El Chaure) (Mene) - Sinclair)
Pertigalete
PTO. DE LA CRUZ
Refinería de Caripito (Creole)
Cumanacoa
BARCELONA
San Antonio
Pto. Piritu
Clarines
Altagracia de Orituco
Refinería
QUIAMARE
(Mene)
LA CEIBA
(Mene)
CERRO PELADO
(Mene)
Refinería Tucupita (Texas)

# WORLD PETRO


Isla La Blanquilla (Ven.)
Islas Los Hermanos (Ven.)
I B E
I. Los Testigos (Ven.)
La Sola (Ven.)
+182.9 mts. Prof.
-182.9 mts. Prof.
NUEVA ESPARTA
I. Los Frailes (Ven.)
ISLA DE MARGARITA
Juan Griego
Sta. Ana
LA ASUNCION
San Juan
Pampatar
Porlamar
Isla Tortuga (Ven.)
CUENCA DE CARIACO
Sup. 18.000 Km.²
I. Cubagua
I. Coche
Rio Caribe
Península de Araya
Golfo de Cariaco
Carúpano
Cariaco
CUMANA
El Pilar
San Antonio del Golfo
REFINERIAS
Refinería de Pto. la Cruz (El Chaure) (Mepeg - Sinclair)
Pertigalete
PTO. DE LA CRUZ
Refinería de Caripito (Creole)
Cumanacoa
Río Neverí
BARCELONA
Caripe
17 Km; 8"-10"
Caripito
San Antonio
Pto. Piritu
Clarines
Refinería de Pto. La Cruz
Refinería de Pertigalete
Refinería Tucupita (Texas)
Pregua de Maturín
QUIAMARE (Mepeg)
Caicara
GERRO PELADO
LA CEIBA (Mepeg)
STA. BARBARA
TRAVESO
JUSEPIN (Creole)
MATURIN

# TROLEUM REPORT 1958


MARACAIBO
Sup. 67.000 Km.²
Refinería de El Cubo (Shell)
Bobures
RIO DE ORO (Shell)
LOS BARQUITOS (Shell)
EL CUBO (Shell)
TARRA (Shell)
TARRA W (Shell)
TIBU
PETROLEA
San Carlos
MERIDA
Ejido
Lagunillas
Tovar
Bailadores
La Grita
San Juan de Colón
Pregonero
Lobatera
Independencia
Táriba
San Antonio
Rubio
SAN CRISTOBAL
TACHIRA
MERIDA
Río Negro
Río Chama
Río Zulia
Río Catatumbo
Río Escalante
Río Torbes
Río Uribante
Río Sarare
Río Apure



(Shell)
MOTATAN
(Creole)
TRUJILLO
TRUJILLO
Betijoque
Escuque
Valera
Boconó
Biscucuy
Carache
La Quebrada
Torondoy
Mucuchies
MERIDA
Barinitas
BARINAS
Obispos
OBISPOS
ROJAS
Refineria de Silvestre (Socony)
SILVAN
(Socony)
SILVESTRE
(Socony)
SINCO
(Sinclair)
Ciudad Bolivia
SUBCUENCA DE BARINAS
Sup. 87 000 Km²
Libertad
Puerto Nutrias
Bruzual
Guanarito
Guanare
PORTUGUESA
ACARIGUA
Araure
Piritu
Ospino
Villa Bruzual
SAN CAR
Lagunita
Guasdualito
Rio Apure
Rio Portuguesa
Rio Guanare
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Cº Guaritico
INSET
Columbia Border Area
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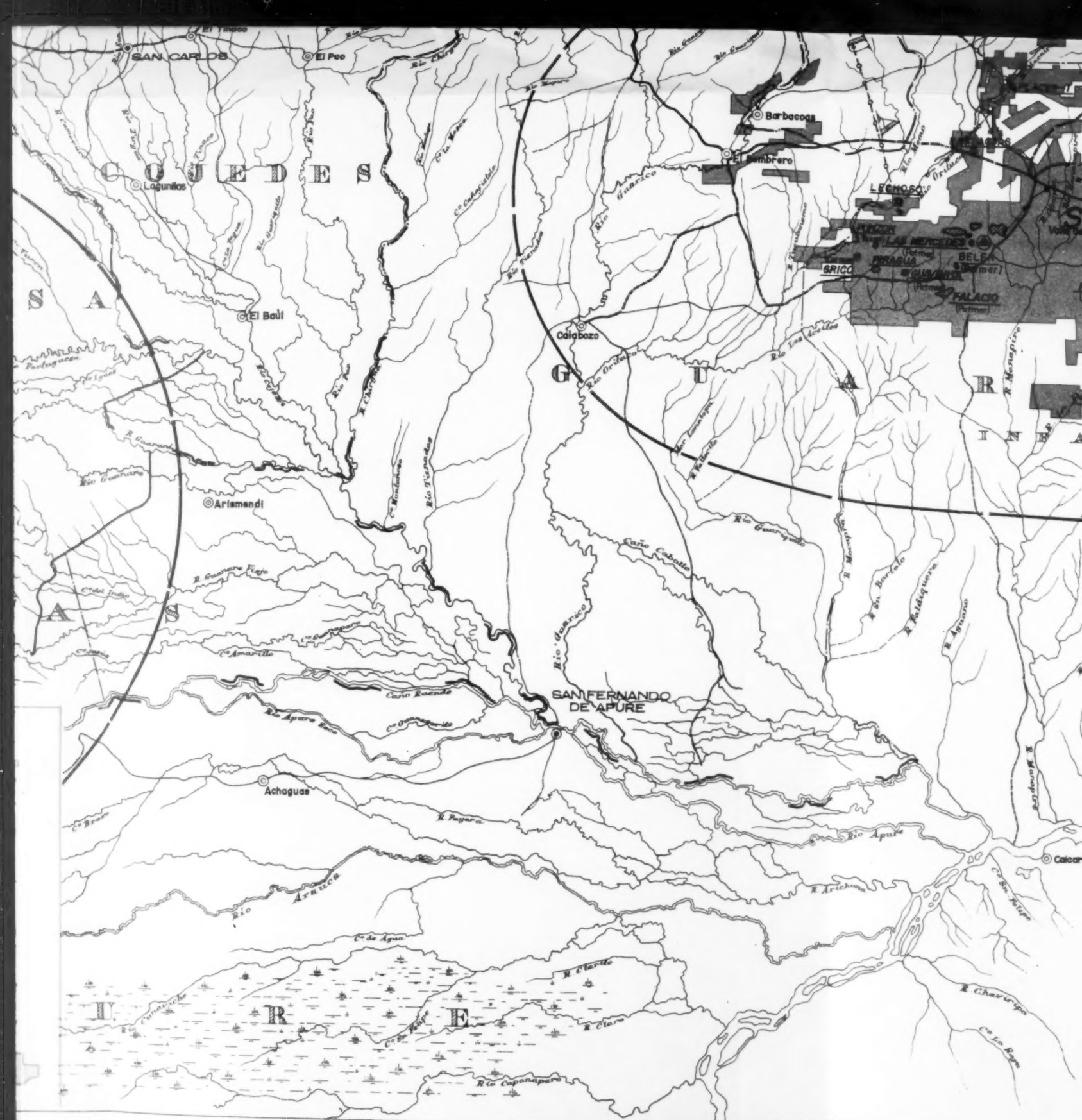
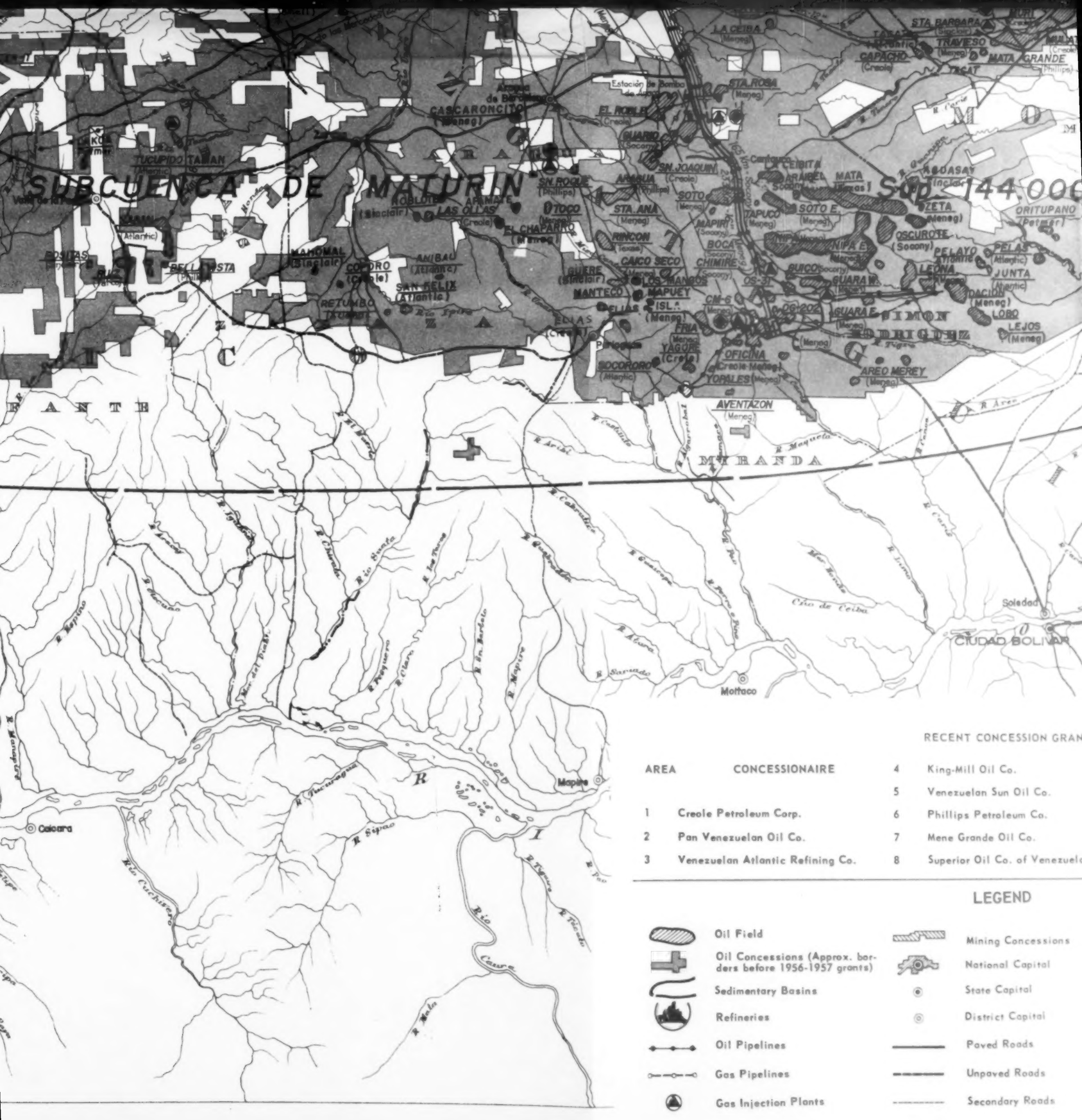

SAN CARLOS
El Paso
Barbacoas
El Sombrero
LECHOSO
LAS MERCEDES
BELEN
GRICO
FALACIO
Lagunillas
El Baùl
Calabozo
Arismendi
SAN FERNANDO DE APURE
Achaguas
Caicara
COJEDES
GUARICO
APURE
Río Guarico
Río Apure
Río Arauca
Río Capanaparo
Caño Caballo
Caño Rasco

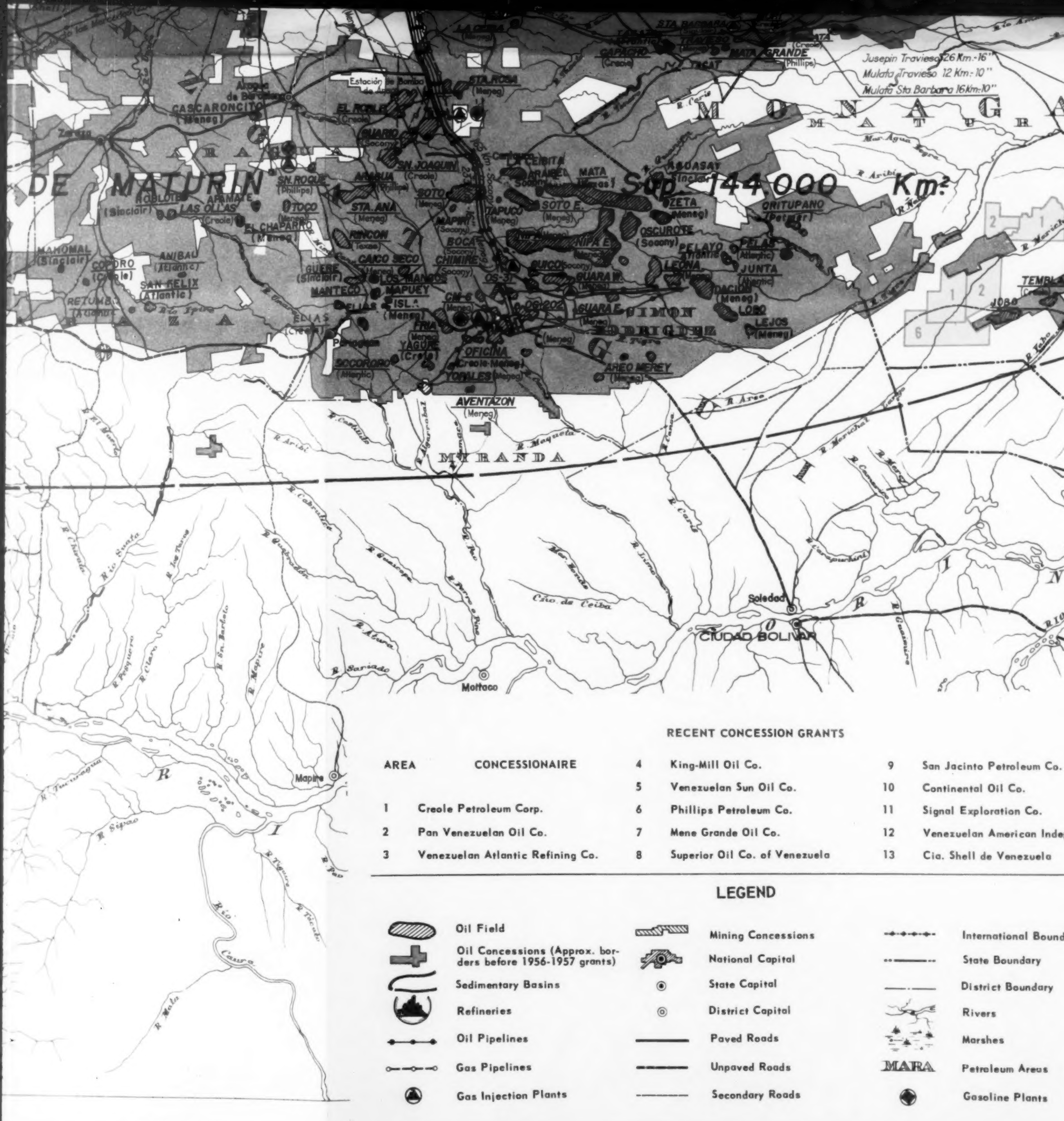



RECENT CONCESSION GRAN

| AREA | CONCESSIONAIRE | | |
|---|---|---|---|
| | | 4 | King-Mill Oil Co. |
| | | 5 | Venezuelan Sun Oil Co. |
| 1 | Creole Petroleum Corp. | 6 | Phillips Petroleum Co. |
| 2 | Pan Venezuelan Oil Co. | 7 | Mene Grande Oil Co. |
| 3 | Venezuelan Atlantic Refining Co. | 8 | Superior Oil Co. of Venezuela |

## LEGEND

- Oil Field
- Oil Concessions (Approx. borders before 1956-1957 grants)
- Sedimentary Basins
- Refineries
- Oil Pipelines
- Gas Pipelines
- Gas Injection Plants
- Mining Concessions
- National Capital
- State Capital
- District Capital
- Paved Roads
- Unpaved Roads
- Secondary Roads

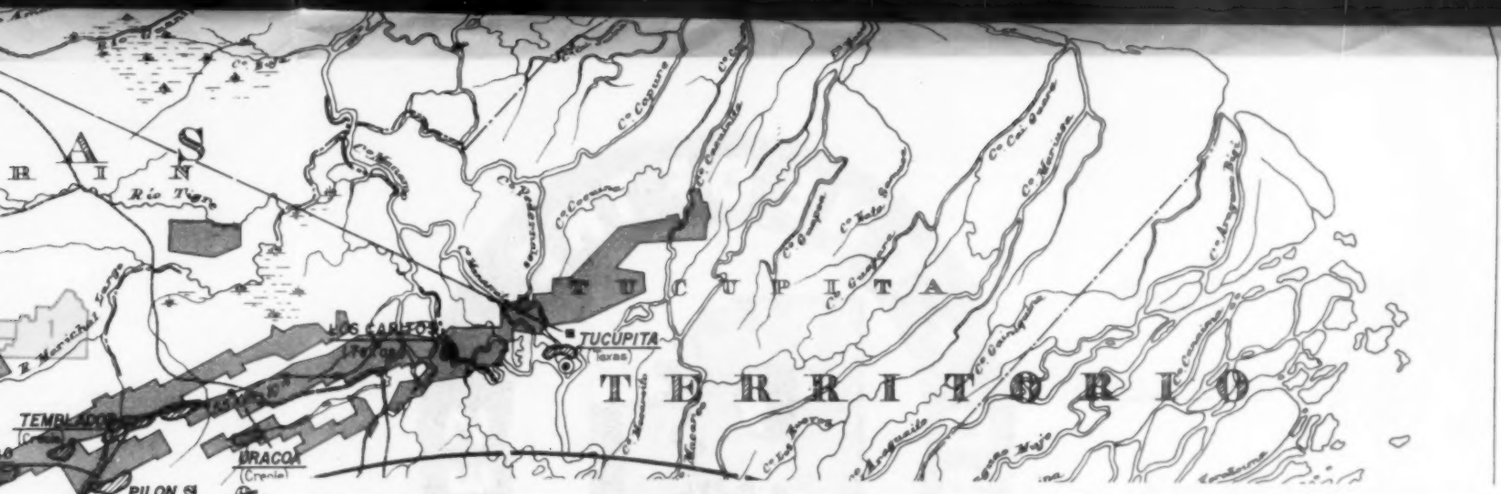



RECENT CONCESSION GRANTS

| AREA | CONCESSIONAIRE | AREA | CONCESSIONAIRE | AREA | CONCESSIONAIRE |
|---|---|---|---|---|---|
| | | 4 | King-Mill Oil Co. | 9 | San Jacinto Petroleum Co. |
| | | 5 | Venezuelan Sun Oil Co. | 10 | Continental Oil Co. |
| 1 | Creole Petroleum Corp. | 6 | Phillips Petroleum Co. | 11 | Signal Exploration Co. |
| 2 | Pan Venezuelan Oil Co. | 7 | Mene Grande Oil Co. | 12 | Venezuelan American Indep |
| 3 | Venezuelan Atlantic Refining Co. | 8 | Superior Oil Co. of Venezuela | 13 | Cia. Shell de Venezuela |

## LEGEND

- Oil Field
- Oil Concessions (Approx. borders before 1956-1957 grants)
- Sedimentary Basins
- Refineries
- Oil Pipelines
- Gas Pipelines
- Gas Injection Plants
- Mining Concessions
- National Capital
- State Capital
- District Capital
- Paved Roads
- Unpaved Roads
- Secondary Roads
- International Bounda
- State Boundary
- District Boundary
- Rivers
- Marshes
- MARA Petroleum Areas
- Gasoline Plants



oleum Co.
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Plants


# PETROLEUM MAP OF VENEZUELA

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Dib. Henry Zerpa L. : 6-5-58

PETROLEUM

# PETROLEUM MAP OF VENEZUELA

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**IDECO, INC.**—*drilling rigs*
**LANE-WELLS COMPANY**—*technical oilfield services*
**MAGNET COVE BARIUM CORPORATION**—*drilling muds*
**PACIFIC PUMPS, INCORPORATED**—*pumps*
**ROOTS-CONNERSVILLE BLOWER DIVISION**—*blowers & meters*
**SECURITY ENGINEERING DIVISION**—*drilling bits*
**SOUTHWESTERN INDUSTRIAL ELECTRONICS**—*electronic instrumentation*
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| IDECO drillings rigs | LANE-WELLS COMPANY technical oilfield services | MAGNET COVE BARIUM CORP. drilling mud | PACIFIC PUMPS, INC. pumps |
| ROOTS-CONNERSVILLE BLOWER DIVISION blowers | SECURITY ENGINEERING DIVISION drilling bits | SOUTHWESTERN INDUSTRIAL ELECTRONICS electronic instrumentation | WELL SURVEYS, INC. nuclear and electronic research |

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# WORLD PETROLEUM REPORT

AN ANNUAL REVIEW OF INTERNATIONAL OIL OPERATIONS

VOLUME IV—JANUARY 15, 1958

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211 Tunisia
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Associate Editor

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# WORLD

***SUMMARY/FORECAST:*** *Exploration rising—hit new high outside U.S. Production up only 6% to 17,647,000 b/d in 1957. Refining capacity up 1.9 million b/d in 1957—may rise 2 million b/d in 1958. Transportation surplus in tankers, pipeline construction high. Consumption up only 7% in 1957, estimated 7% in 1958. Oil Laws passed in three countries, pending in three more. Government trend toward increased participation in exploitation rising.*

## PHYSICAL DEVELOPMENT

**Exploration:** Exploratory interest during 1957 again was dominated by developments outside the United States. The major exploratory discovery likely to come on production during 1955-65 is in Algeria. It has concentrated a major drilling rush on the Sahara — where USA companies have joined with French in the Algerian section of the Sahara. This area's geology makes it unlikely discoveries there will be small.

North America continued without a major discovery—although there was an encouraging find in Alaska. In Latin America, activity was concentrated on Venezuela—where Lake Maracaibo drilling promised important production increases. In the Middle East, the outstanding well was drilled by Aramco, Kurais No. 1.

Trend toward entry of the so-called "independent" oil company into exploration outside its home country continued and intensified during 1957. Hundreds of these companies are so engaged at present, and the total of their activities is increasing rapidly. It is estimated that, by 1965, there will be approximately 1,000,000 b/d of crude production at their disposal through new discoveries. At present, they have about 250,000 b/d production available outside the United States and Canada. Their exploration outside the USA is stimulated principally by two factors — the first of which is cost. The expenditures required to find one barrel of oil within the United States are far in excess of those in other areas. The second factor is the lack of good exploration prospects within the United States. This is pointed up by the fact that drilling in Venezuela yields approximately 300 bbl per well drilled, whereas in the USA it is approximately 12 bbl per well drilled.

**Geophysical:** World geophysical activity is estimated to have increased during 1957. Final figures are not available, but incomplete SEG figures for 1956 indicate a new high in worldwide geophysical activity was reached. The average of geophysical crews of all types employed was 1,136 during 1956, compared with 1,119 in 1955. All of this increase occurred in the Eastern Hemisphere. Activities in the Western Hemisphere were below 1955 because of declines in the United States and Canada. Activity in 1956 in South America continued at about the 1955 level. The total for 1957 of rotary drilling rigs decreased compared with the previous year—principally because of the decline in the USA and Canada. As covered under USA section, rotary drilling in the United States has decreased substantially, due partly to increased costs and also to a shift in drilling activity to areas outside the United States.

Especially sharp rises in drilling during 1957 are noted in Brazil, Venezuela, Turkey, and Algeria.

**Production:** World crude production increased 6.8% during 1957—a rate of increase slightly below that for 1956, which was 7.2%. The lesser increase, of course, is explained by the Suez crisis and the decline in Europe's consumption—partly accounted for by a slowing down of her industrial boom. USA demand during 1957 also was below expectations—with consequent effect on production.

Despite the Suez crisis, world trend toward increasing production outside the United States continued. Percentagewise, the United States dropped to about 40.4% of world production during 1957 from 44% two years previously. Canada continued to increase slightly. Relatively, Venezuela remained the same.

The most startling increase was shown by Russia, where production jumped about 3.7% during 1957—to around 9.5% of world production.

In the Middle East, only Iran showed a gain in her relative position as an oil producer. All other producers in the Middle East lost ground, relatively. This was due, of course, to the Suez crisis. This area will resume its increase during 1958—barring some unforeseen development.

Two new oil-producing areas came into production during 1957. The first oil from the Sahara reached the Mediterranean via truck and railway. This area will supply a large share of world production in the future if expectations are realized. A small amount of oil was derived from the Gabon in Africa, but this area is not expected to become a major producer.

*Conservation*—Conservation practices affect about 95% of the world's production. They are most highly developed in Venezuela, the United States, and Canada—having reached their highest development in the USA. In the USA conservation is administered by the Interstate Oil Compact Commission, as covered under the United States section of this report. This commission invites "official observers" from other countries or provinces. These official observers have members on committees of the compact, attend meetings, participate in discussions—and have access to all compact information. Legally, they have no right to vote or hold office, but in all other respects are similar to the states which compose the compact. At present, the Canadian provinces of Alberta and Saskatchewan, as well as the republics of Venezuela and Colombia, have the status of official observers.

In general, conservation practices are followed by most of the countries in producing areas of the world. This is because the majority of the world's oil production is by USA companies which have learned to appreciate the increased oil and gas recovery and the decreased costs which accompany a rational development program.

At present, there exists no official international agency to represent all producing nations with respect to conservation. It is conceivable, however, that in the future such an agency will be proposed should world productive capacity approach an excess. Particularly would this be true were more of the smaller companies to participate in world oil production. The tendency then would be toward an excessive rate of production due to the com-

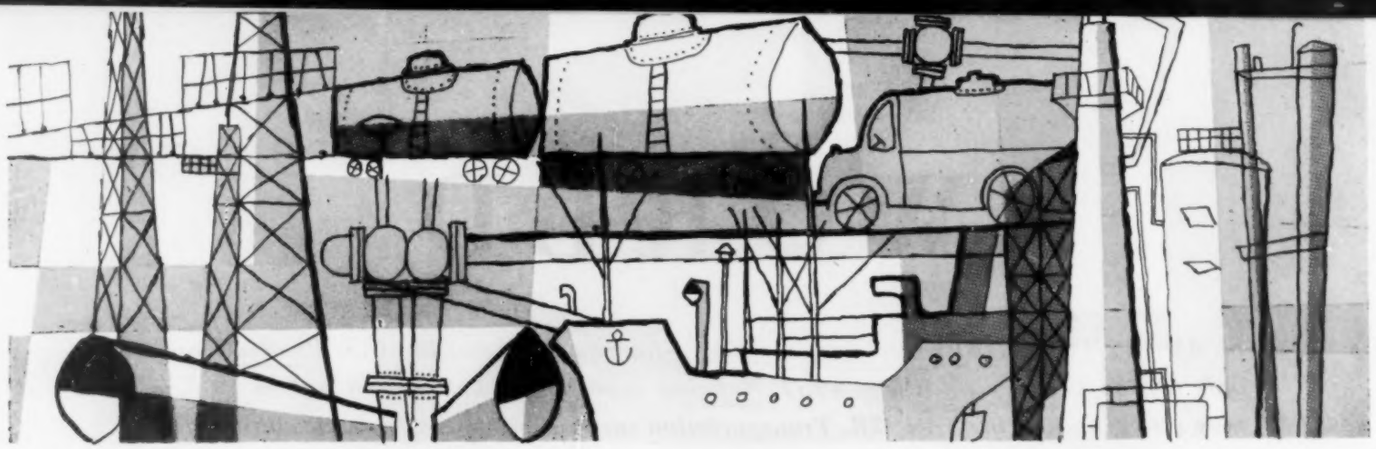
(Continued on page 16)

*For regional developments, see the eight major regional divisions following. For national developments, see appropriate country section.

**CREW-MONTHS OF GEOPHYSICAL EXPLORATION FOR PETROLEUM**

| | U.S.A. | | | Canada | | | Western Hemisphere | | | Eastern Hemisphere | | | World | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1955 | 1956 | Percent Change | 1955 | 1956 | Percent Change | 1955 | 1956 | Percent Change | 1955 | 1956 | Percent Change | 1955 | 1956 | Percent Change |
| Seismic | 7,090 | 6,813 | — 3.9 | 1,496 | 1,423 | — 4.9 | 9,395 | 9,062 | — 3.5 | 1,589 | 1,983 | +24.8 | 10,984 | 11,045 | + 0.6 |
| Gravity | 1,074 | 998 | — 7.1 | 103 | 88 | —14.6 | 1,431 | 1,369 | — 4.3 | 621 | 855 | +37.7 | 2,052 | 2,224 | + 8.4 |
| Magnetic | 76 | 45 | —40.8 | —— | 1 | | 146 | 127 | —13.0 | 173 | 166 | — 4.0 | 319 | 293 | — 8.2 |
| Other | —— | 1 | | —— | —— | | 15 | 18 | +20.0 | 60 | 48 | —20.0 | 75 | 66 | —12.0 |
| Total | 8,240 | 7,857 | — 4.6 | 1,599 | 1,512 | — 5.4 | 10,987 | 10,576 | — 3.7 | 2,443 | 3,052 | +25.0 | 13,430 | 13,628 | + 1.5 |

Source: SEG Committee on Geophysical Activity.



# World Functional Division of Major Petroleum Data — Year 1957

(Barrels Daily)

| | Production | Refining: No. of Plants | Refining: Crude Capacity | Refining: Cracking Capacity | Consumption(a): 1957 | Consumption(a): % Change Over 1956 | Proved Reserves (Millions of Barrels) |
|---|---|---|---|---|---|---|---|
| Aden | — | 1 | 120,000 | — | 72,000 | + 1.4 | — |
| Albania | 10,000 | 3 | 3,400 | — | — | — | 20 |
| Algeria | 300 | .. | — | — | 41,000 | — | 1,000(b) |
| Argentina | 91,800 | 16 | 216,670 | 113,340 TC | 255,000 | + 6.3 | 2,300 |
| Australia | — | 6 | 204,000 | 56,500 C | 185,000 | + 5.7 | — |
| Austria | 60,100 | 9 | 49,410 | 11,000 T | 43,000 | + 7.3 | 395 |
| Bahrain Island | 31,700 | 1 | 186,500 | 36,700 TC | 28,000 | — | 200 |
| Belgium | — | 8 | 152,300 | 30,500 TC | 134,000 | + 11.6 | — |
| Bolivia | 9,800 | 4 | 11,900 | — | 7,000 | + 16.6 | 70 |
| Brazil | 27,200 | 8 | 111,800 | 16,400 T | 229,000 | + 9.0 | 350 |
| British Borneo | 116,200 | 1 | 50,000 | — | — | — | 550 |
| Bulgaria | — | 3 | 9,000 (e) | — | — | — | — |
| Burma | 8,900 | 2 | 6,500 | — | 8,000 | + 14.3 | 45 |
| Canada | 499,200 | 43 | 704,350 | 352,825 TC | 771,000 | + 7.0 | 3,600 |
| Chile | 11,700 | 4 | 20,360 | 16,000 T | 42,000 | + 5.0 | 25 |
| China (Communist) | 30,800 | 4 | 18,000 | — | — | — | 750 |
| Colombia | 121,600 | 4 | 73,000 | 44,760 TC | 57,000 | + 7.5 | 650 |
| Cuba | 1,000 | 5 | 53,675 | 3,300 C | 72,000 | + 10.8 | 3 |
| Czechoslovakia | 3,900 | 4 | 26,000 | — | — | — | 15 |
| Denmark | — | 3 | 980 | — | 90,000 | + 13.9 | — |
| East Germany | — | 2 | 4,800 | — | — | — | — |
| Ecuador | 8,700 | 2 | 5,650 | — | 8,000 | — | 25 |
| Egypt | 42,100 | 3 | 74,000 | 6,500 T | 98,000 | + 2.0 | 275 |
| Finland | — | 1 | 18,000 | — | 37,000 | + 12.1 | — |
| Formosa | — | 1 | 28,000 | 14,000 TC | — | — | — |
| France | 28,000 | 15 | 628,470 | 119,450 TC | 434,000 | — 1.1 | 150 |
| Germany (West) | 76,700 | 29 | 335,010 | 80,300 TC | 392,000 | + 23.3 | 365 |
| Greece | — | 1 | 27,000 | — | 35,000 | + 6.1 | — |
| Hawaiian Islands | — | 1 | 3,000 | — | — | — | — |
| Hungary | 14,300 | 4 | 24,000 | — | — | — | 150 |
| India | 9,100 | 4 | 101,900 | 18,600 TC | 131,000 | + 12.9 | 300 |
| Indonesia | 314,700 | 5 | 230,300 | 44,500 T | 86,000 | + 11.7 | 3,000 |
| Iran | 723,700 | 2 | 463,000 | 102,000 TC | 96,000 | + 17.1 | 32,000 |
| Iraq | 452,600 | 4 | 45,630 | 18,000 T | 33,000 | + 3.1 | 25,000 |
| Israel | 1,600 | 1 | 87,000 | 23,500 T | 33,000 | + 10.0 | 8 |
| Italy (including Sicily) | 27,600 | 35 | 550,500 | 68,320 TC | 310,000 | + 9.5 | 200 |
| Japan | 6,200 | 22 | 410,300 | 32,800 TC | 279,000 | + 14.8 | 25 |
| Kuwait | 1,140,300 | 1 | 30,000 | — | 33,000 | + 10.0 | 50,000 |
| Lebanon | — | 2 | 20,500 | — | 27,000 | + 3.9 | — |
| Mexico | 250,000 | 8 | 340,000 | 46,500 TC | 299,000 | + 16.8 | 3,000 |
| Morocco | 1,600 | 1 | 2,300 | 1,800 C | 18,000 | + 5.3 | 9 |
| Netherlands | 29,100 | 2 | 261,000 | 95,000 TC | 188,000 | + 8.7 | 115 |
| Netherlands West Indies | — | 2 | 650,000 | 460,000 TC | 134,000 | + 2.3 | — |
| Neutral Zone | 62,200 | — | — | — | — | — | 368(c) |
| Norway | — | 1 | 1,800 | — | 66,000 | + 8.2 | — |
| Pakistan | 6,000 | 1 | 5,000 | — | 37,000 | + 5.7 | 22 |
| Peru | 52,700 | 3 | 46,000 | 14,500 T | 43,000 | + 7.3 | 275 |
| Philippine Islands | — | 1 | 13,000 | 5,400 C | 45,000 | + 5.7 | — |
| Poland | 3,700 | 7 | 12,000 | — | — | — | 20 |
| Portugal | — | 1 | 27,000 | 10,000 C | 32,000 | + 6.7 | — |
| Puerto Rico | — | 2 | 65,500 | 58,000 C | 33,000 | + 13.8 | — |
| Qatar | 141,000 | 1 | 600 | — | — | — | 1,500 |
| Romania | 219,200 | 15 | 157,000 | 69,000 TC | — | — | 600 |
| Saudi Arabia | 1,987,700 | 1 | 189,000 | — | 56,000 | + 1.8 | 45,000 |
| South Africa | — | 2 | 20,000 | 7,700 TC | 88,000 | + 7.3 | — |
| Spain | — | 3 | 115,700 | 3,500 T | 78,000 | + 6.8 | — |
| Sweden | — | 4 | 47,900 | 1,000 T | 206,000 | + 10.2 | — |
| Switzerland | — | 2 | 1,850 | — | 62,000 | + 14.8 | — |
| Trieste | — | 3 | 32,600 | 3,000 C | — | — | — |
| Trinidad | 93,700 | 3 | 127,000 | 48,500 TC | 34,000 | + 3.0 | 300 |
| Turkey | 5,700 | 1 | 7,000 | 3,000 C | 37,000 | + 12.1 | 65 |
| United Kingdom | 1,700 | 16 | 618,150 | 127,300 TC | 659,000 | + 3.6 | 7 |
| USSR | 1,974,900 | 68 | 1,800,000 | 520,000 TC | 2,055,000 | + 15.5 | 23,000 |
| United States | 7,150,000 | 320 | 8,922,000 | 100,000 TC | 9,107,000 | + 4.0 | 30,500 |
| Uruguay | — | 1 | 28,000 | 7,000 TC | 29,000 | + 3.6 | — |
| Venezuela | 2,780,200 | 11 | 612,100 | 88,000 T | 158,000 | + 11.3 | 14,000 |
| Yugoslavia | 8,400 | 3 | 19,800 | 1,100 T | 20,000 | + 11.0 | 32 |
| TOTALS | 17,647,200 | 747 | 19,227,205 | 2,879,595 | 17,550,000 | + 8.75 | 237,484 |

**Note:** Production and consumption data are averages for 1957. Refining data are as of the end of 1957. Reserve figures are not strictly comparable; all are 1957 figures, but for varying dates during the year. All have been obtained from reliable sources which are available to subscribers on request.

a Crude-equivalent basis.
b Estimated by French sources; may include some "probable" reserves.
c From Eocene and Burgen zones only; Ratawi not known.
e Estimate.

# ETHYL U·S·A·

**Serving Refiners . . .**

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ETHYL CORPORATION, with home offices in New York City, is an integrated manufacturing, research, sales and service organization known overseas as Ethyl USA.

With three antiknock compound manufacturing plants (and a fourth under construction) and with broad experience in overseas shipment, Ethyl Corporation* is in a good position to supply your requirements.

**You can be sure of dependable supplies from Ethyl USA**

**You get more helpful services when you buy from Ethyl USA**

As the originator and first marketer of tetraethyl lead antiknock compounds, Ethyl Corporation has served the petroleum industry for 35 years.

Throughout this period we have endeavored to assist our customers whenever possible at every stage of their use of our products. This experience enables us to offer you a most helpful program of "plus value" services.

These services cover tetraethyl lead handling and mixing with gasoline, and the blending and marketing of gasoline. They include a broad selection of educational and training materials.

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*If you would like additional information about Ethyl Corporation as a world supplier of antiknock compounds, write for a copy of the brochure entitled "Ethyl USA." Please address your request to the Export Sales Department at the address below.*

*Ethyl Corporation and its wholly-owned subsidiary in Canada are not affiliated with any other supplier of antiknock compounds.

**ETHYL CORPORATION** 100 Park Avenue, New York 17, N.Y., **U.S.A.**

## WORLD

(Continued from page 13)

panies' need to sell their own oil and to meet government demands for increased production as an aid to government revenues.

**Refining:** World refinery capacity, by country, is given in accompanying tables. On a nationality basis, world refining capacity is owned 59% by USA companies—representing about 11 million b/d. Of this, about 15% is located outside the United States, according to the Petroleum Information Bureau of London. British and associated Dutch companies are estimated to own about 15% of total world refining capacity—amounting to about 2.8 million b/d. The communist countries, with a total capacity around 1.8 million b/d, had 10% in 1956.

World refining capacity is estimated to have risen 1.3 million b/d during 1956—to a total of about 18.8 million b/d at the beginning of 1957. Projects under construction are estimated to raise this total to about 20.7 million b/d at the beginning of 1958. Of total capacity at

(Continued on page 22)

### ROTARY RIGS ACTIVE (Outside Communist Countries)

| | 1948 (March) | 1954 (March) | 1955 (Feb.) | 1956 (March) | 1957 (Oct.) |
|---|---|---|---|---|---|
| **WESTERN HEMISPHERE** | | | | | |
| **NORTH AMERICA** | | | | | |
| Alaska | 2 | 3(S. I.) | 3 | 5 | 2 |
| Canada, Western | NA | 155* | 205* | 226* | 182 |
| United States | NA | 2,568** | 2,465** | 2,630** | 2,297 |
| **CENTRAL AMERICA** | | | | | |
| British Honduras | 0 | 0 | 0 | 1 | 0 |
| Costa Rica | 0 | 0 | 1 | 1 | 1 |
| Cuba | NA | 1 | 6 | 12 | 4 |
| Haiti | 0 | 0 | 0 | 1 | 0 |
| Mexico | 37 | 82 | 75 | 88 | 94 |
| **SOUTH AMERICA** | | | | | |
| Argentina | 50 | 45 | 48 | 48 | 57 |
| Barbados | NA | 1 | 1 | 1 | 0 |
| Bolivia | 2 | 6 | 7 | 8 | 12 |
| Brazil | 5 | 8 | 9 | 28 | 48 |
| Chile | 4 | 5 | 5 | 5 | 5 |
| Colombia | 24 | 23 | 19 | 22 | 26 |
| Ecuador | 11 | 9 | 7 | 10 | 7 |
| Paraguay | 2 | 0 | 0 | 0 | 0 |
| Peru | 21 | 22 | 18 | 21 | 16 |
| Trinidad | 22 | 27 | 28 | 26 | 27 |
| Uruguay | 0 | 0 | 0 | 1 | 0 |
| Venezuela | 133 | 110 | 104 | 100 | 118† |
| **EASTERN HEMISPHERE** | | | | | |
| **EUROPE** | | | | | |
| Austria | 0 | 0 | NA | 32 | 32 |
| British Isles | 9 | 6 | 6 | 9 | 3 |
| Denmark | 1 | 0 | 0 | 0 | 1 |
| France | 22 | 25 | 26 | 29 | 20 |
| Germany (West) | 80 | 140 | 127 | 106 | 120 |
| Greece | 0 | 1 | 1 | 3 | 1 |
| Italy (incl. Sicily) | 15 | 30 | 30 | 34 | 30 |
| Netherlands | 4 | 6 | 6 | 8 | 5 |
| Portugal | NA | 2 | 2 | 2 | 2 |
| Spain | 3 | 2 | 3 | 3 | 3 |
| **MIDDLE EAST** | | | | | |
| Bahrain | 2 | 2 | 1 | 3 | 1 |
| Egypt | 8 | 3 | 8 | 8 | 4 |
| Iran | 9 | 1 | 4 | 5 | 10 |
| Iraq | 6 | 13 | 12 | 14 | 6 |
| Israel | NA | 1 | 4 | 12 | 9 |
| Kuwait | 9 | 3 | 5 | 3 | 7 |
| Lebanon | 1 | 0 | 0 | 0 | 0 |
| Neutral Zone | NA | 2 | 3 | 2 | 6 |
| Qatar | 2 | 2 | 3 | 2 | 2 |
| Trucial Coast | NA | 1 | 1 | 4 | 1 |
| Saudi Arabia | 7 | 7 | 4 | 4 | 5 |
| Syria | 3 | 0 | NA | NA | 2 |
| Turkey | 2 | 2 | 5 | 5 | 8 |
| Jordan | NA | NA | NA | NA | 1 |
| **OTHER ASIA** | | | | | |
| Australia | 2 | 4 | 9 | 12 | 4 |
| Burma | 2 | 2 | 2 | 2 | 2 |
| Indonesia & British Borneo | 21 | 42 | 32 | 32 | 35 |
| India | 12 | 6 | 6 | 6 | 6 |
| Pakistan | | 5 | 5 | 5 | 8 |
| Japan | 4 | 15 | 15 | 15 | 16 |
| New Guinea | 5 | 4 | 4 | 4 | 4 |
| New Caledonia | NA | 1 | 1 | 1 | 1 |
| Philippines | 1 | NA | NA | NA | 1 |
| **AFRICA** | | | | | |
| Algeria | 2 | 9 | 9 | 14 | 24 |
| Angola | NA | 1 | 1 | 1 | 2 |
| Ethiopia | NA | NA | 1 | 1 | 0 |
| French Equatorial Africa | 1 | 3 | 3 | 9 | 10 |
| Morocco | 6 | 9 | 9 | 8 | 5 |
| Madagascar | 1 | 1 | 1 | 1 | 2 |
| Mozambique | NA | 1 | 1 | 1 | 1 |
| Nigeria | NA | 4 | 6 | 6 | 7 |
| Tunisia | 2 | 8 | 6 | 6 | 4 |
| Br. Somaliland | NA | NA | NA | NA | 1 |
| Somalia | 0 | 0 | 0 | 0 | 1 |
| Libya | 0 | 0 | 0 | 1 | 3 |
| | | | | 3,645 | 3,402 |

NOTE: The foregoing figures are estimates in some instances.

*Canada: Jan. '52, 172; Jan. '54, 144; Jan. '55, 187; Jan. '56, 194.
**United States: Jan. '52, 3,021; Jan. '54, 2,591; Jan. '55, 2,496; Jan. '56, 2,829.
NA—Not Available. † Excludes 37 rigs on workover & service.

### WORLD CRUDE-OIL PRICES

(As of Nov. 15, 1957)

| United States | API Grav. | US$/bbl. | Venezuela | API Grav. | US$/bbl. |
|---|---|---|---|---|---|
| East Texas | 39° | 3.25 | San Joaquin | 41.0-41.9° | 3.34 |
| Signal Hill | 27-27.9° | 3.17 | Tia Juana Med. | 26.0-26.9° | 2.55 |
| **Middle East** | | | | | |
| Qatar, ex Umm Said | 40-40.9° | 2.23 | **British Borneo** | | |
| Arabian, ex Ras, T. | 27-27.9° | 1.79 | Seria, ex Lutong | 37° (approx) | 2.75 |

### FREE WORLD PETROLEUM SUPPLY

| | 1956 | 1961 | 1966 | Change 1966 from 1956 Percent |
|---|---|---|---|---|
| | Thous. Bbls. Per Day | | | |
| Canada | 470 | 750 | 1,300 | +176.6 |
| Mexico | 253 | 400 | 550 | +117.4 |
| Venezuela | 2,457 | 3,500 | 4,500 | + 83.2 |
| United States | 7,939 | 9,600 | 11,000 | + 38.6 |
| Other West Hemp. Countries | 373 | 500 | 750 | +101.1 |
| Total Western Hemisphere | 11,492 | 14,750 | 18,100 | + 57.5 |
| Middle East | 3,448 | 5,125 | 8,600 | +149.4 |
| Far East | 402 | 550 | 700 | + 74.1 |
| Other Countries | 237 | 300 | 600 | +153.2 |
| Total Eastern Hemisphere | 4,087 | 5,975 | 9,900 | +142.2 |
| Total Free World | 15,579 | 20,725 | 28,000 | + 79.7 |
| Other Sources | 150 | 300 | 500 | +233.3 |
| Total | 15,729 | 21,025 | 28,500 | + 81.2 |

Source: Chase Manhattan Bank.

### WORLD TANKER SUPPLY BALANCE*

(T-2 Equivalents)

| Year-End | Total Fleet A | Total Fleet B | Requirements | Surplus A | Surplus B |
|---|---|---|---|---|---|
| 1956 | 2,376 | | | | |
| 1957 | 2,644 | 2,726 | 2,530 | 114 | 196 |
| 1958 | 2,917 | 3,126 | 2,695 | 222 | 431 |
| 1959 | 3,181 | 3,565 | 2,871 | 310 | 694 |
| 1960 | 3,458 | 3,999 | 3,058 | 400 | 941 |

* For vessels of 10,000 deadweight tons and over.
A NPC estimate of deliveries; scrappage after 20 years.
B Jacobs' estimate of deliveries; scrappage after 25 years.
Source: Article by Walter J. Levy, *World Petroleum*, Nov. 1957.

### ESTIMATED WORLD TANKER TONNAGE*

(T-2 Equivalents)

| Year-End | Deliveries A | Deliveries B | Scrappage C | Scrappage D | Total Fleet E | Total Fleet F |
|---|---|---|---|---|---|---|
| 1956 | | | | | 2,376 | |
| 1957 | 300 | 358 | 8 | 32 | 2,644 | 2,726 |
| 1958 | 300 | 404 | 4 | 27 | 2,917 | 3,126 |
| 1959 | 300 | 443 | 4 | 36 | 3,181 | 3,565 |
| 1960 | 300 | 447 | 13 | 23 | 3,458 | 3,999 |

* For vessels of 10,000 deadweight tons and over.
A National Petroleum Council.
B John I. Jacobs & Co., Ltd.
C 25-year life.
D 20-year life.
E = A-D.
F = B-C.
Source: Article by Walter J. Levy, *World Petroleum*, Nov. 1957.

### WORLD—PRODUCT PRICES

(May-September 1957)

| Product | Belgium | Brazil | Canada | Egypt | India | Jamaica | Japan | Netherlands | US |
|---|---|---|---|---|---|---|---|---|---|
| Gasoline | 48.1 | 120.0 | 38.4 | 45.4 | 47.9 | 37.2 | 42/45 | 46.1 | 32.5 |
| Kerosine | 23.8 | 100.6 | 33.3 | 14.9 | 17.2 | 21.2 | 26.3/31.5 | 21.2 | 16.3 |

Source: World Retail Prices and Taxes on Gasoline, Kerosine and Motor Lubricating Oils, U. S. Dept. of Interior, Vol. 26, No. 3. Data are for capitol cities except U. S. kerosine price which is for Chicago. Calculated at average exchange rate. Includes all taxes and duties. Prices are retail. Given in cents per gallon (US).

## Vertol 44 solves transport problem for oil industry

The petroleum industry has a new tool, the Vertol 44 helicopter, to cut manhours, money and misery out of exploratory drilling at remote sites.

The Vertol 44 is a heavy-duty, universal vehicle that makes the sky a 100 mph highway, almost any clearing a landing field. Gone is the need to hack roads in jungle, swamp and mountains. You may need it for these money-saving missions:

**Flying Truck:** The Vertol 44 carries more than 2 tons of cargo in tropical areas...transports the entire 175,000 lbs. of a drill rig over a distance of 50 miles out and back, in only 56 flying hours. Its 600 cu. ft. cabin accommodates 50% more cargo than any other commercial helicopter, with no problem of load placement.

**Flying Bus:** Airlifts up to 19 passengers ... 2 typical field crews ...to jungle derricks or offshore drills ... flies exploration teams to otherwise inaccessible spots.

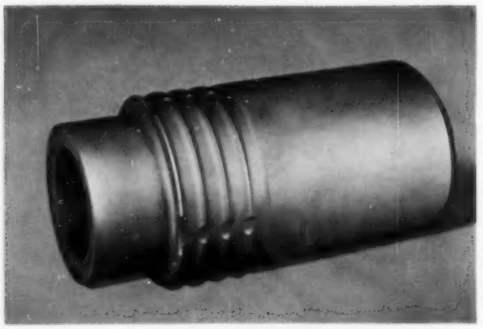
**Flying Crane:** Hops rivers, ridges and swampland with sling-loads of pipe, rig superstructure, large pump components or even mobile field offices.

**Flying Tractor:** Frees mired vehicles, hauls barges, drags sledges. It has even towed a 3,000-ton ship.

For more information on this multi-purpose vehicle for the oil industry, write to: Customer Relations Department

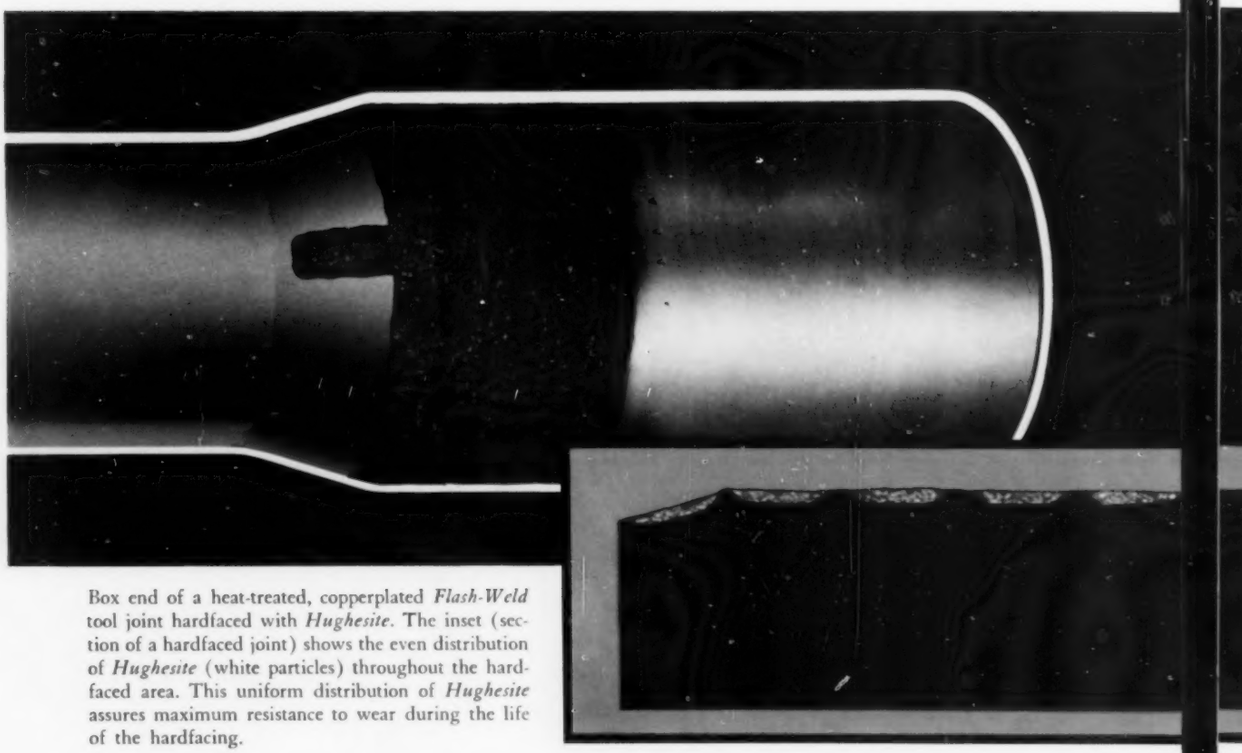
VERTOL Aircraft Corporation

MORTON, PENNSYLVANIA.



Square shoulder *"Flash-Weld"* tool joint grooved for hardfacing.

# why **HUGHES** hardfacing doubles *(often triples)* life of tool joints

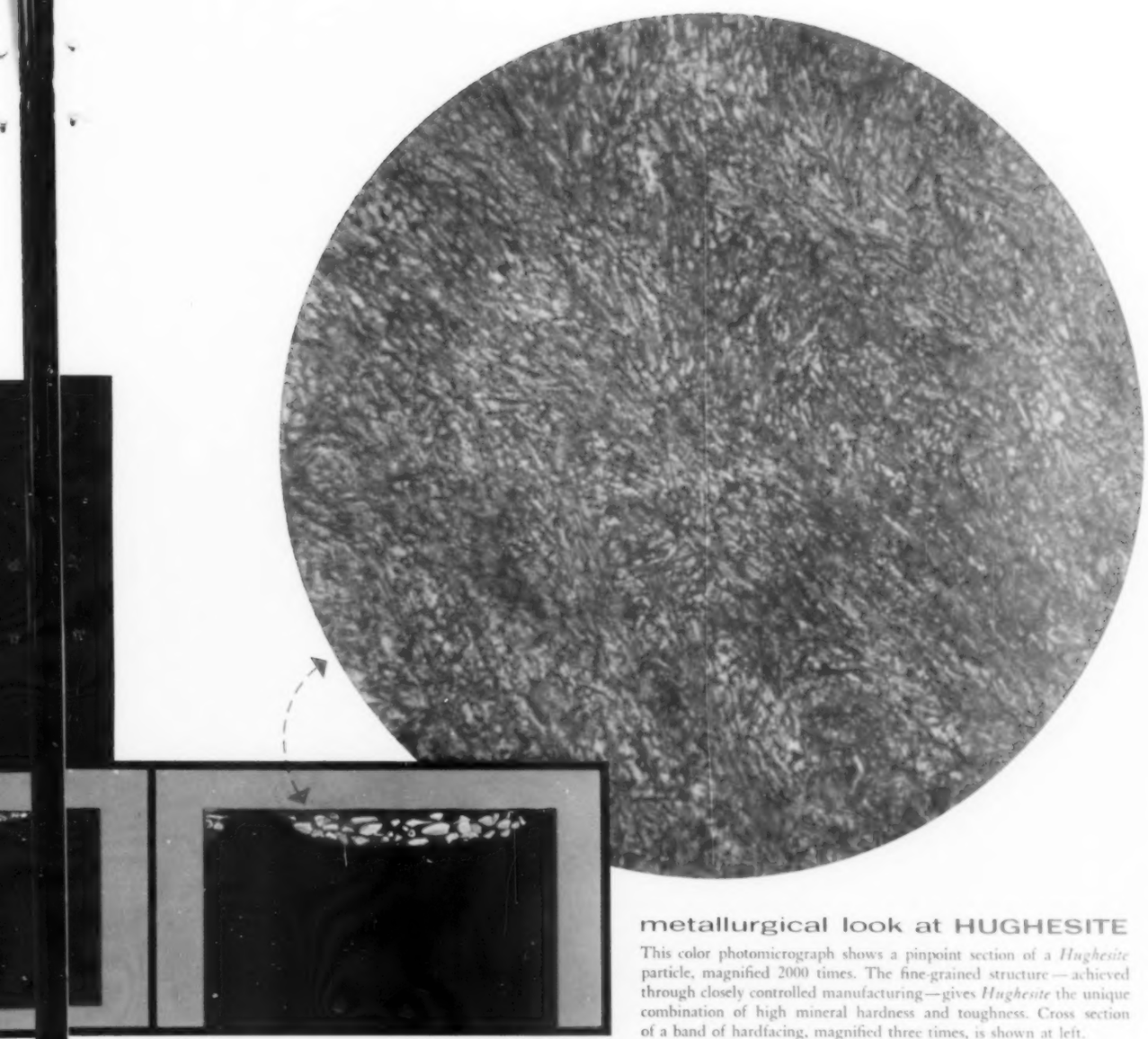


Box end of a heat-treated, copperplated *Flash-Weld* tool joint hardfaced with *Hughesite*. The inset (section of a hardfaced joint) shows the even distribution of *Hughesite* (white particles) throughout the hardfaced area. This uniform distribution of *Hughesite* assures maximum resistance to wear during the life of the hardfacing.

When you get a Hughes hardfaced tool joint, you get two things: 1) A basically superior tool joint, 2) A hardfacing material — *"Hughesite"* — 25 times more wear resistant than hardened steel — plus a proved method of application.

Hughes pioneered hardfacing. To get a material that would do the job hardfacing is called upon to perform, we produced our own: developed the specifications for the raw material and perfected the manufacturing process and method of application.

*Hughesite* is a tungsten carbide alloy many times harder than the hardest mineral formations encountered in oil well drilling.



## metallurgical look at HUGHESITE

This color photomicrograph shows a pinpoint section of a *Hughesite* particle, magnified 2000 times. The fine-grained structure—achieved through closely controlled manufacturing—gives *Hughesite* the unique combination of high mineral hardness and toughness. Cross section of a band of hardfacing, magnified three times, is shown at left.

*Hughesite* is not just another name for a hardfacing material. It is the product of a sequence of closely controlled operations, starting with raw material of the highest purity and ending with the hardest known material that can be successfully used to hardface tool joints.

That is why Hughes hardfacing, year-after-year, has consistently proved to be equivalent to an extra set (and often an extra two sets) of non-hardfaced tool joints . . . and at only a fraction of the cost of replacing them.

For the *greatest possible tool joint economy* run Hughes hardfaced tool joints wherever abrasive formations are likely to be encountered.

*Hughes hardfacing is available on "Seal Grip" and tapered and square shoulder "Flash Weld" tool joints.*

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Houston, Texas

DEVELOPERS OF "FLASH-WELD," "SEAL-GRIP" AND COUNTERBORE WELD TOOL JOINTS

# Here's how to get more for your money in lease production equipment

It is now possible to combine separating and metering in one vessel — for very little more than the cost of a separator alone. ROLOCHECK Metering Separators not only separate oil and gas efficiently, they accurately meter the oil as well.

## Use ROLOCHECK Metering Separators as:

**Test Separators** — Automatically separate and meter a well's production on test, enabling tested well's production to be recombined into bulk line to storage. Eliminate test tank and manual test tank gauging.

**Individual Well Separators** — Continuously separate *and meter* production from each well, allowing common field gathering lines and savings in flow lines, tankage and labor. In addition, obtain valuable *continuous* production records.

## ROLOCHECK Metering Separators are available in two types:

**Two-Phase Unit** separates oil and gas, metering total liquid. Meter is a genuine ROLOCHECK, designed for and proven in oil field service. Meter alternately fills with a calibrated volume of liquid from the separator section, then discharges this volume to storage. Metered volumes are totalized on a counter.

**Three-Phase Unit** separates oil, water and gas, and meters both oil and free water by means of two ROLOCHECK Meters built right in the vessel. Water can be discharged to disposal after metering.

**Features:**

*Rolo Neutral Position 3-Way Meter Valves* . . . assure maximum meter accuracy with no slippage.

*Efficient separation* using monel mesh mist extractors.

*All sizes and working pressures* are available.

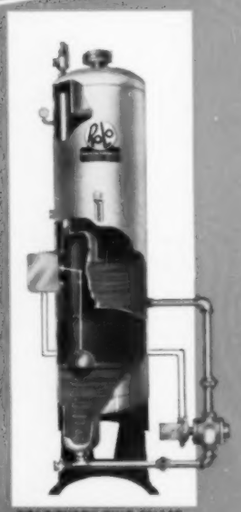
**Optional Accessories:**

*Rolo Automatic Sampler* obtains and collects samples from oil meter so that water percentage can be determined.

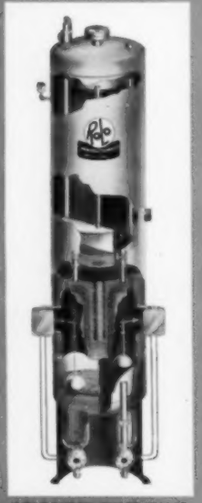
*Completely piped gas lines* with orifice fittings, gas meters, etc.

*Special internal coatings* to inhibit paraffin deposits.

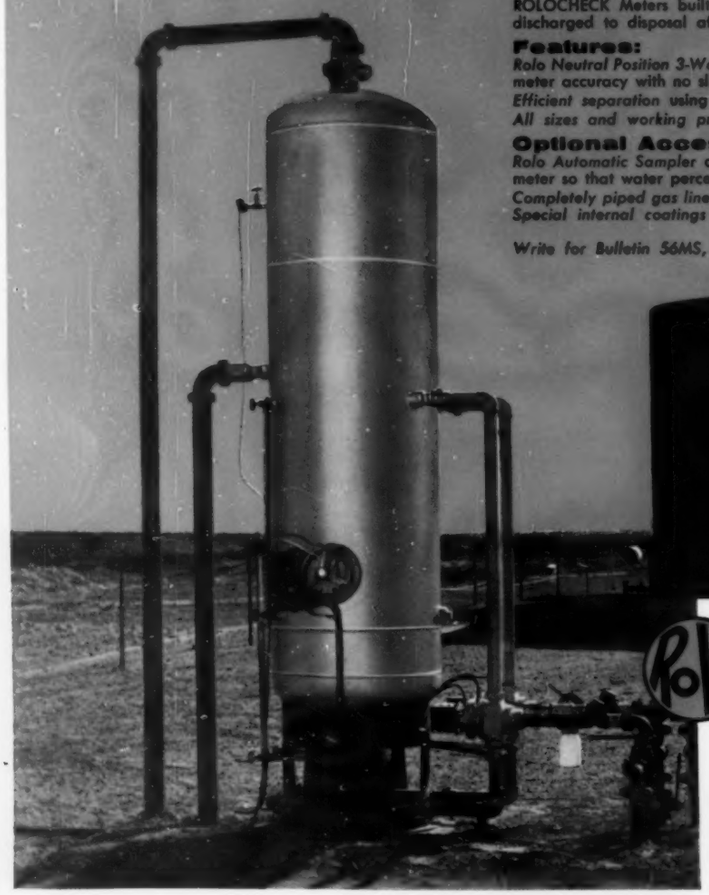
*Write for Bulletin 56MS, or see your nearest representative.*



ROLOCHECK TWO-PHASE METERING SEPARATOR



ROLOCHECK THREE-PHASE METERING SEPARATOR



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Federal Microwave for pipelines is "Microwave at its best"... meeting every requirement of long-haul right-of-way operations for reliable, all-weather, high-quality *voice, supervisory and control circuits.*

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## WORLD

(Continued from page 16)

beginning of 1957, nine million b/d was located in the United States. About 2.3 million b/d was located in Latin America. Western Europe had about 2.7 million b/d, and the remaining 2.9 million was distributed throughout the rest of the world.

A recent definitive figure is given in the accompanying table for July 1957. At that time, world refinery capacity was 19,251,705 b/d. World cracking capacity was 7,870,975 b/d.

**Transportation:** During 1957, the world tanker market turned full circle. A year previously, at the height of the Suez crisis, tonnage had been fully utilized—with rates very strong. In succeeding months, a frantic scramble for tonnage boosted rates to a record high. At the end of 1957, however, the supply of tonnage was excessive, and rates had fallen to depressed levels.

This surplus, as shown by accompanying tables, is continuing. Tankers under construction show a rise—from slightly less than 400 T-2 equivalence in 1957 to as high as 524 in 1959—followed by some tapering off to 498 in 1960.

**WORLD TANKER FLEET**
(June 30, 1957)

| Ownership | Number | Dw tons |
|---|---|---|
| Oil company | 1,212 | 17,949,531 |
| Tramp | 1,397 | 24,680,126 |
| Government | 244 | 2,860,659 |
| Miscellaneous | 37 | 415,125 |

Calculations of supply indicate surplus tonnage will double by 1958—and this would be intensified were world demand not to reach expectations. It is doubtful, however, that such a surplus will result in view of the flexibility of tanker constructors. New orders probably will be curtailed, and some cancelled. Should this prove true, in some two to three years the surplus will have been reduced and tanker markets again strengthened.

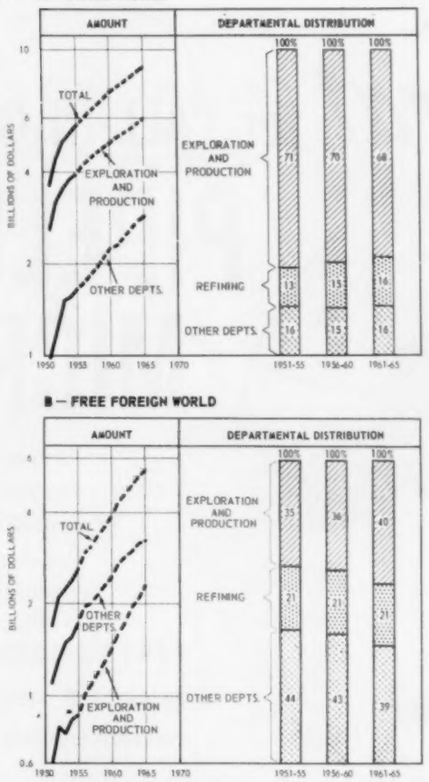
**WORLD TANKER FLEET**
(June 30, 1957)

| Flag | Number | Dw tons | Per cent |
|---|---|---|---|
| British | 564 | 8,118,017 | 17.26 |
| U. S. | 483 | 7,712,229 | 16.40 |
| Liberian | 311 | 7,427,512 | 15.79 |
| Norwegian | 417 | 6,977,732 | 14.83 |
| Panamian | 184 | 3;326,058 | 7.08 |
| French | 122 | 2,054,454 | 4.37 |
| Italian | 130 | 1,959,077 | 4.17 |
| Dutch | 122 | 1,568,727 | 3.34 |
| Swedish | 85 | 1,399,544 | 2.98 |
| Japanese | 62 | 1,105,343 | 2.35 |
| Danish | 53 | 927,260 | 1.97 |
| Russian | 73 | 680,116 | 1.45 |
| German | 36 | 518,847 | 1.10 |
| Other | 310 | 3,235,868 | 6.91 |
| Total | 2,952 | 47,010,784 | 100.00 |

Source: J. I. Jacobs, Ltd.

According to an analysis by John I. Jacobs & Co. Ltd., the estimated world tanker fleet at mid-1957 totaled 47,010,784 dwt (deadweight tons), contained in 2,952 vessels. Principal features were growth under the Liberian flag, and a decline in tonnage under the USA flag of about 240,000 tons during the first half of the year. These estimates from London indicate an increase over the figures in the report of the Sun Oil Co., which indicated total world deadweight tonnage as 44,882,600 in 2,778 ships at the end of December 1956—nearly double the world's tanker-fleet capacity at the end of World War II.

**CAPITAL EXPENDITURES OF PETROLEUM INDUSTRY**
ESTIMATED 1951-1955 PROJECTED 1956-1965




*Source: Chase Manhattan Bank*

A striking trend has been toward use of the so-called supertankers. They comprised 2.7% of carrying capacity of the December 1956 fleet.

**Marketing:** *Consumption*—In a review of world developments, attention tends to center on oil consumption, which is the principal determinant of production levels as well as of refining and transportation facilities. Increased world oil demand has been one of the most spectacular developments in the industry's postwar era. While demand appears extremely favorable for the long term, various short-term considerations make the picture less favorable for the next several years.

The overall outlook for world consumption is less favorable during 1957-58 and years immediately following than it has been in the postwar period generally. The effect of the Suez emergency during the first quarter of 1957 on world demand outside the United States and Russia was reflected in the overall 7% growth rate in 1957 (estimated) over 1956. The anticipated rate of growth during 1957 without such an emergency would have been in the neighborhood of 9% to 10%. Principal area affected by the Suez emergency, of course, was the Eastern Hemisphere west of Suez. In the Western Hemisphere, and in the Eastern Hemisphere east of Suez, petroleum demand generally was normal. Suez tended to slow down the rate of oil growth in Europe by causing European consumers to think increasingly of other forms of energy such as coal, or hydroelectric power and atomic power. Also, it forced Europeans to more economical operation and more efficient fuel utilization—a trend which will continue in the future. The tailing off in the European industrial boom also tended to depress oil's growth rate percentagewise.

During 1958, an anticipated 8.8% increase for the Free World outside the United States and Russia is expected to raise demand to about 7,823,000 b/d. By 1967, this is expected to rise to about 12,500,000 b/d, or 74% over 1957. The oil industry outside the USA and Russia will have to double its ability to take care of its customers and create new facilities to handle this rise.

The rise in the use of petroleum outside the USA and Russia has been truly fantastic since 1917. In that year, consumption was about 350,000 b/d, according to a report by A. J. McIntosh, of Socony Mobil Oil Co. Inc. Growth since 1947 has been 171%, or 4,500,000 b/d. The whole Free World by 1967 may show a demand of more than 25,000,000 b/d, or about 56% over 1957.

Since 1920, according to estimates of The Chase Manhattan Bank, demand growth in the world outside the communist bloc has increased an average 6.3% yearly. Free World demand by 1966 will average 28.5 million b/d —or an estimated growth rate of 6.2% during the coming decade.

(Continued on page 27)

**PETROLEUM DEMAND IN THE FREE WORLD**

| Area | 1956 | 1961 | 1966 | Change 1966 from 1956 Percent |
|---|---|---|---|---|
| | Thous. Bbls. Per Day | | | |
| United States .. | 8,757 | 11,200 | 14,300 | + 63.3 |
| Free Foreign ... | 6,793 | 9,825 | 14,200 | +109.0 |
| Total Free World | 15,550 | 21,025 | 28,500 | + 83.3 |

*Source: Chase Manhattan Bank*

**WORLD—INVESTMENT IN PROPERTY, PLANT AND EQUIPMENT**
(As of Dec. 31, 1956)

| Area | Gross Million Dollars | Gross Percent |
|---|---|---|
| United States | 43,700 | 61.7 |
| Canada | 3,200 | 4.5 |
| Venezuela | 4,200 | 5.9 |
| Other Western Hemisphere | 3,000 | 4.2 |
| Western Europe | 4,850 | 6.8 |
| Africa | 625 | 0.9 |
| Middle East | 3,000 | 4.2 |
| Far East | 2,400 | 3.5 |
| Unallocated (incl. Foreign Flag Tankers) | 5,900 | 8.3 |
| Total | 70,875 | 100.0 |

*Source: Chase Manhattan Bank*

**DEMAND FOR PETROLEUM PRODUCTS ESTIMATED 1957 AND FORECAST FOR 1958**
(Thous. Bbls. Daily)

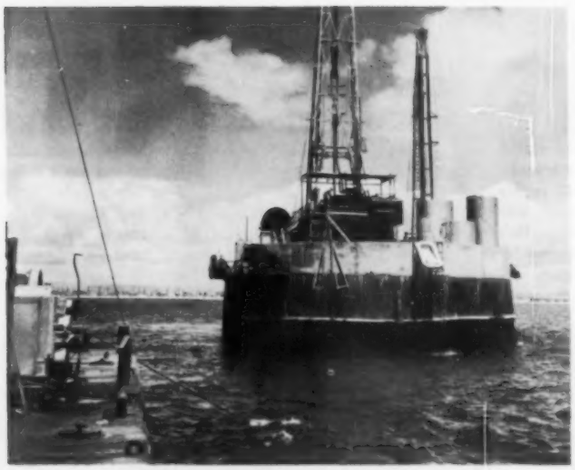
| | 1957 Estimated | 1958 Forecast | Change from 1957 Volume | Change from 1957 % |
|---|---|---|---|---|
| Domestic Demand—U.S. | | | | |
| Gasoline | 3,835 | 3,950 | 115 | 3.9 |
| Middle Distillates | 2,037 | 2,085 | 48 | 2.4 |
| Residual Fuel Oil | 1,523 | 1,523 | — | — |
| All Other Products | 1,516 | 1,585 | 69 | 4.6 |
| *Total Domestic Demand-U.S. | 8,911 | 9,143 | 232 | 2.6 |
| Exports from U.S. | 565 | 299 | (266) | (47.1) |
| Total Demand U.S. | 9,476 | 9,442 | (34) | (0.4) |
| *Free Foreign Countries | 7,187 | 7,823 | 636 | 8.8 |
| Total Free World (a) | 16,098 | 16,966 | 868 | 5.4 |

(a) Total of above lines marked *

# World-Wide Experience

## *in submarine pipeline construction*

*Sea-Loading Lines . . .*



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Mission Super-Service Liners for fluid ends of oil field pumps feature an induction hardened bore that assures extremely long life.

Mission Centrifugal Pumps feature Concentric Casing design that minimizes wear and maintains rated output longer under difficult abrasive and corrosive conditions.

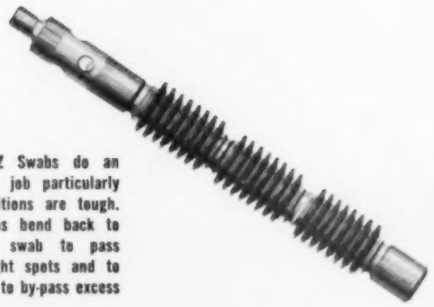
Mission Mud Monarch Valves for reciprocating pump fluid ends give remarkable service and economy in many installations. Being unaffected by valve body and seat wear, they give longer trouble-free service than any other valve.

Mission Super-Service Valves for reciprocating pump fluid ends give excellent service under a wide variety of conditions.

Mission Self-Sealing Gland Packings for reciprocating pump fluid ends are economical, easy to install, require infrequent adjustment, and make rods last longer. They have been a favorite for years among operators.

Mission Fluid End Pistons feature replaceable piston rubbers and a unique design that results in unusually long life. Far more Mission pistons are sold than all other makes combined.

Mission Piston Rods for reciprocating pump fluid ends are made in two types. The Mission File-Hard Piston Rod gives outstanding service when corrosion is negligible and abrasives in the fluid are limited. Super-Chrome Piston Rods save operators money in all types of corrosive and abrasive service.



Mission E-Z Swabs do an outstanding job particularly when conditions are tough. Flexible fins bend back to allow the swab to pass through tight spots and to unload and to by-pass excess fluid.

Mission Plug Valves feature a wedge-proof core which is cylindrical, split lengthwise and ground to exact body curvature. The automatic lubrication system acts like a plastic packing to form a gas-tight seal. These valves are ideal for most production applications and in certain refinery and general industrial services.

Mission Silver Top Valves and Seats for pump fluid ends, feature replaceable bushings that reduce valve seat replacement costs in many services.

Mission Super-Service Liner Packing offers these important benefits to operators: long lasting, economical, requires virtually no re-tightening after initial tightening, danger of pump washouts practically eliminated. Recommended for high and normal pressure applications.

Mission Tubing Spiders feature Mission's exclusive Rolling Dogs and a simple rugged construction that makes them favorites of operators everywhere.

Mission Rolling Dog Slips have long been noted for their positive grip, instant release, and well-balanced design.

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With extensive distribution facilities and two factories, one in Houston and one in Belfast, Northern Ireland, Mission is prepared to give operators all over the world the full benefit of Mission's outstanding products.

If you would like further information on the name of a distributor on any of these products, write Mission either in Houston or in London.

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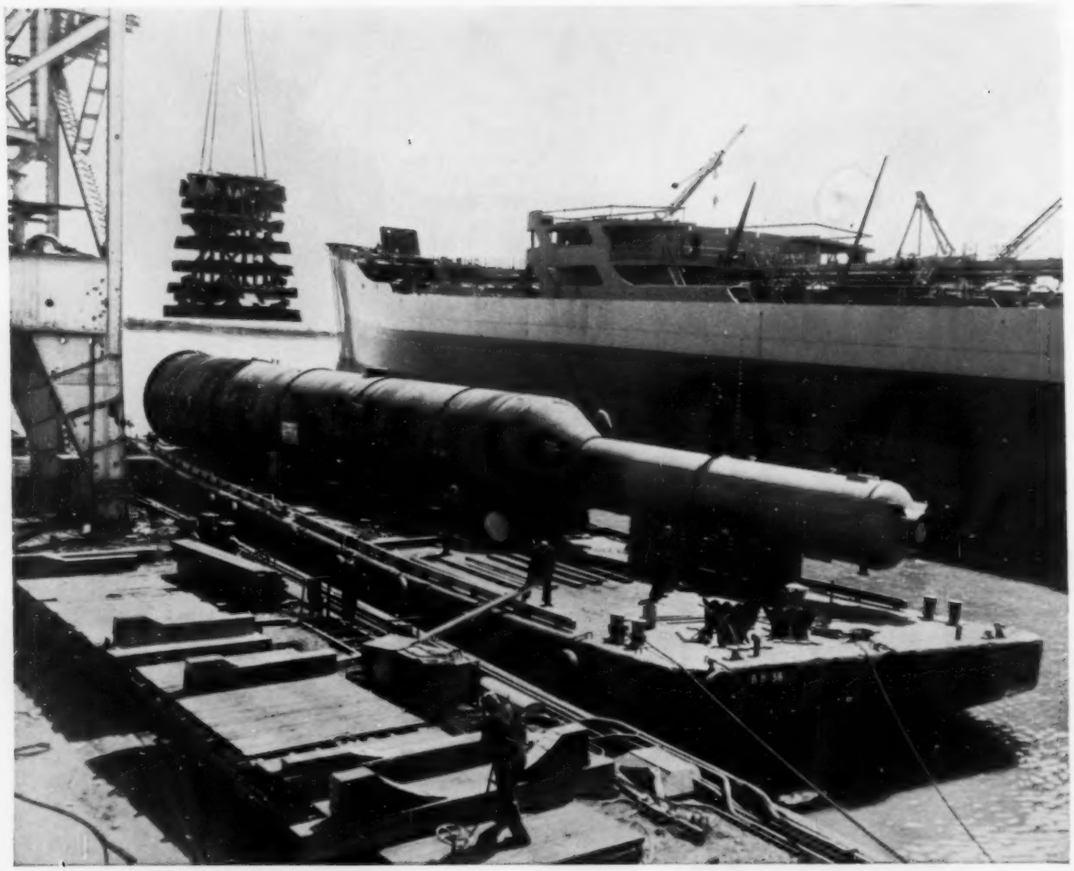

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Our facilities for tidewater shipment are used to economical advantage on many of the massive structures that go into the making of the nation's petroleum and chemical industries. The barge shipment of tower and shed row baffles, shown above, is a good example.

And of course—when shipment by land is necessary—Sun Ship rigging and routing find the ways and means to handle such items as large-diameter columns by rail and truck.

It's all a part of the versatility which forty years' experience has made part of "standard procedure" in service of its customers.

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SHIPBUILDING & DRY DOCK COMPANY

ON THE DELAWARE SINCE 1916 CHESTER, PA.

## WORLD

(Continued from page 22)

Demand outside the USA and Russia is estimated to increase about 7.5% yearly over the next 10 years—approximating USA demand by that time. This anticipated demand is in the neighborhood of 14.2 million b/d—which substantially exceeds the growth in USA demand over the same period.

Among fundamental underlying causes of this increase in demand are: (1) Industrialization programs of underdeveloped countries will gather momentum over the next several decades. (2) Dependence upon petroleum as a source of energy is expected to increase to about 41% of total world energy sources by 1972, in contrast with about 30% in 1955.

*Capital requirements*—Capital expenditures to support the projected increase in demand—with consequent necessary increases in all other phases of the industry—are extremely large. Estimates by The Chase Manhattan Bank underline the difficulty of supplying such tremendous capital resources. Estimated cost of this expansion effort during 1955-65 is $115 billion for the Free World as a whole. A breakdown of this estimated expenditure is given in *World Petroleum Report 1957*.

The expenditure for replacement and expansion of property, plant, and equipment by the entire Free World petroleum industry (including the cost of drilling dry holes, but excluding geological and geophysical expenses and lease rentals) reached an all-time high in 1956—totaling $9,800 million.

| | 1956 | 1955 | % Change |
|---|---|---|---|
| | Million Dollars | | |
| United States | 6,050 | 5,600 | + 8 |
| Free Foreign | 3,750 [1] | 2,645 | +42 |
| Total | 9,800 | 8,245 | +19 |

[1] Includes $310 million for concessions in Venezuela.

A functional distribution of the investments in the United States and in foreign countries is shown in the following tabulation for the 10-year period 1947-56:

| | United States | Free Foreign | Combined |
|---|---|---|---|
| | | Million Dollars | |
| Production | 29,700 | 7,855 | 37,555 |
| Pipelines | 2,305 | 1,295 | 3,600 |
| Marine (incl. tankers) | 635 | 3,800 | 4,435 |
| Refineries & chemical plants | 5,625 | 4,750 | 10,375 |
| Marketing | 3,120 | 2,810 | 5,930 |
| Others | 765 | 690 | 1,455 |
| Total | 42,150 | 21,200 | 63,350 |

It is estimated the industry may spend $130 billion during the 10-year period 1957-66 for the required facilities, as detailed in the following tabulation:

| | United States | Free Foreign | Combined |
|---|---|---|---|
| | | Billion Dollars | |
| 1957-61 | 35.3 | 20.4 | 55.7 |
| 1962-66 | 45.0 | 29.3 | 74.3 |
| 1957-66 | 80.3 | 49.7 | 130.0 |
| Production | 57.6 | 18.8 | 76.4 |
| Refineries and chemical plants | 11.2 | 10.8 | 22.0 |
| Transportation and marketing | 11.5 | 20.1 | 31.6 |
| Total | 80.3 | 49.7 | 130.0 |

The foregoing data include the effect of the following factors: (1) expenditures based on 1957 dollar costs, (2) $375 million in 1957 for additional concessions in Venezuela, (3) intensified exploration program for crude oil reserves in new areas, (4) expansion of pipeline outlets in the Middle East and construction of major pipeline facilities in Western Europe, and (5) construction of refineries and chemical plants in new consuming areas.

*Crude prices*—Crude prices are quoted only in the major oil-producing areas. They are not quoted for many areas—presumably because they are subject to negotiation or because output is marketed by the producing company itself. During 1957 there occurred a major adjustment in crude prices, when USA crude prices moved upward following the Suez crisis. The increase in USA prices immediately was reflected in increases in the Middle East and in Venezuela.

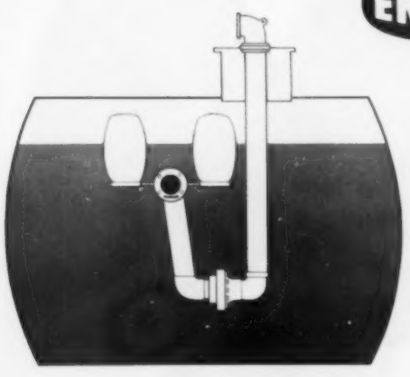
**WORLD ENERGY PRODUCTION 1929-1956**
(In Percent)

| AREA | 1929 % | 1955 % | 1956 [1] % |
|---|---|---|---|
| WORLD | | | |
| Coal | 72.6 | 45.8 | 45.6 |
| Lignite | 4.6 | 5.4 | 5.3 |
| Crude Petroleum | 15.0 | 29.5 | 30.0 |
| Natural Gas | 4.1 | 11.2 | 11.0 |
| Hydro-Electricity | 3.7 | 8.1 | 8.1 |
| Total | 100 | 100 | 100 |

Source: UN Bulletin, May 1957.

Settling time Reduced by Thours (ON JET FUELS)

EMCO PATENT SWING JOINT MAKES SUSPENDED SUCTION WORK



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The Emco Floating Suction Unit with its patent swing joint automatically positions the suction intake below the liquid level allowing output to commence only two hours after input. TANK SIZE NO OBJECT. 6" & 8" units ex stock.

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## OIL LAWS

The trend toward legislation more favorable to operation by private foreign companies continued throughout the world during 1957. Laws generally considered workable were passed in many areas of the Western Hemisphere—especially in Central America, where exploratory activity is increasing.

Beginning at the uppermost part of the Western Hemisphere, Alaska announced opening of the government land reserve under PLO 82, which has kept private companies out of the area since 1943. Legislation also is being considered in Alaska for opening territorial and inland waters. In Canada, new laws were passed in Manitoba and British Columbia, and significant changes occurred in other areas as well. Saskatchewan raised crown-land royalties from a minimum 5% to maximum 16%, on the sliding scale. The province also amended its pipelines' act to provide for more controls over pipelines. In Alberta, new legislation was passed for the Athabaska oil-sands area. Most important development was the province's new conservation act which further restricts production there.

In the United States, no change occurred in the basic 1920 legislation governing exploration. However, many bills were proposed to deal with such subjects as antitrust activities by oil companies, investigation of oil pipelines, and imports into the United States.

In Central America, several countries amended their laws to provide for more liberal treatment of foreign capital. Nicaragua and Honduras are among countries which have passed, or are considering, new laws. In the rest of the Caribbean area and South America, there was no major law change. Two long-standing controversial laws were brought up for consideration—with no decision made. These are in Chile, which finally added the proviso that oil companies would be permitted in the Magallanes area, formerly reserved to the government; and in Brazil, where a workable law was again rejected.

In the Eastern Hemisphere, several favorable laws have been passed in recent years. These include Turkey, France, Denmark, and Sicily. The Italian law, finally passed in 1957, was not considered favorable. The principal oil-law news in Europe concerned the new Spanish code, which was to have been passed at the end of 1957 just before the government monopoly expired.

In the Middle East, principal news was the passage of the new Iranian oil law, which is a rather loose arrangement permitting the government's oil company to conclude contracts with private foreign companies. A contract was concluded this way with Ente Nazionale Idrocarburi (ENI). This contract provides for substantial government participation, and has aroused considerable speculation. A contract was being concluded during December 1957 with Japanese businessmen—this time on Saudi Arabian-Kuwait offshore areas. It differs substantially from the ENI contract, but also provides for an increased government share in profits.

In the remainder of the world—comprising Africa and the Far East—there were no major oil-law changes.

## NATIONAL FACTORS

Trend toward increased government participation in operating companies continued apace in 1957. It was especially evident in the areas of North Africa and the Middle East, where new requirements were instituted for government participation. The trend did not extend to the Western Hemisphere to the same degree.

The general trend toward more liberal oil regulations throughout the world was offset to some degree by increasing restrictions on currencies. The general downturn in world economic activity late in 1957 accentuated the trend. END


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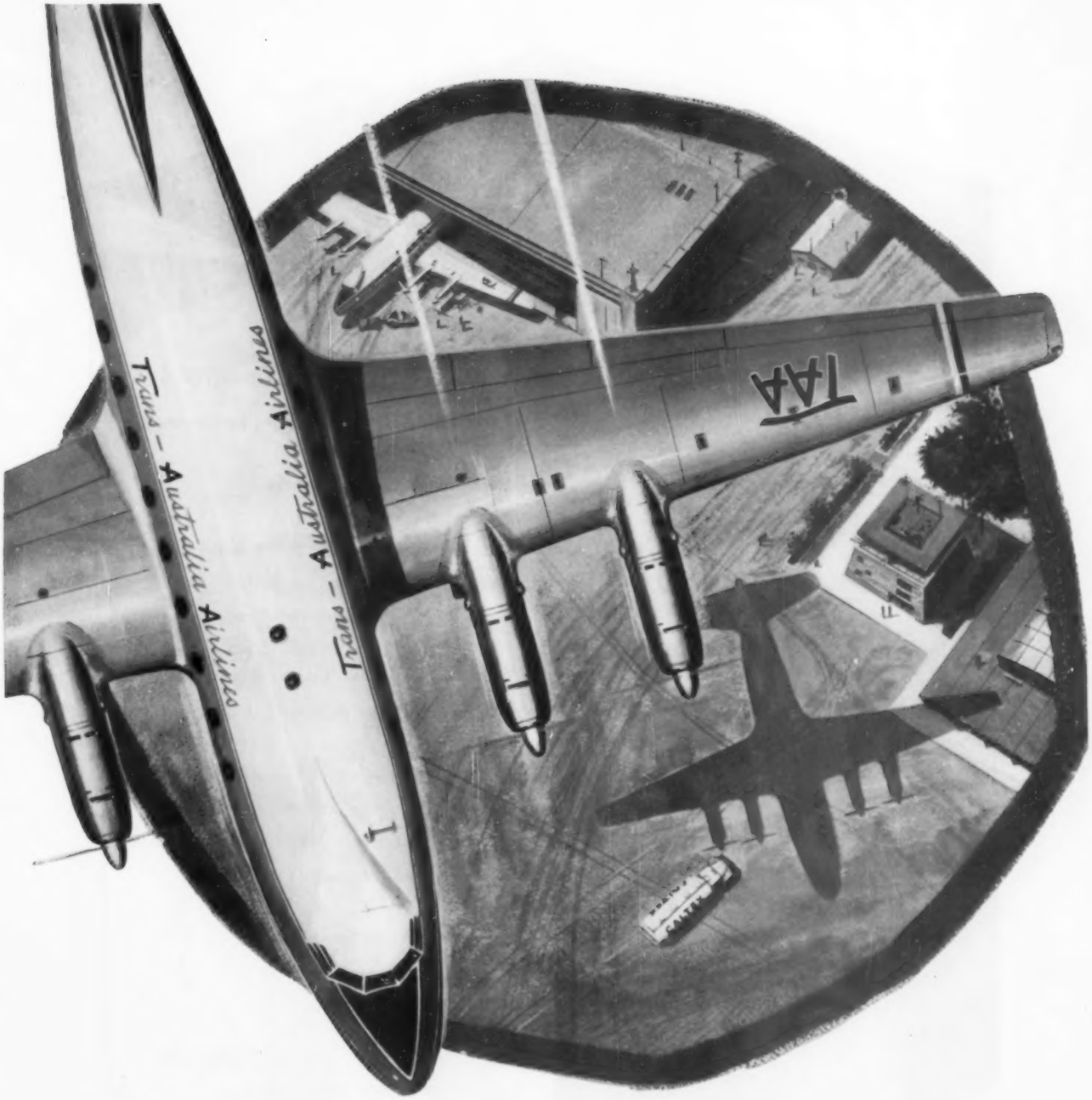


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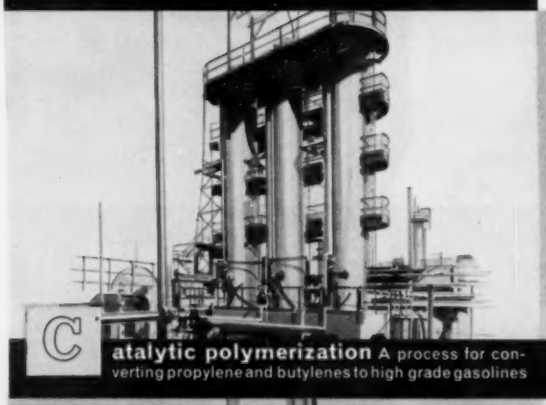

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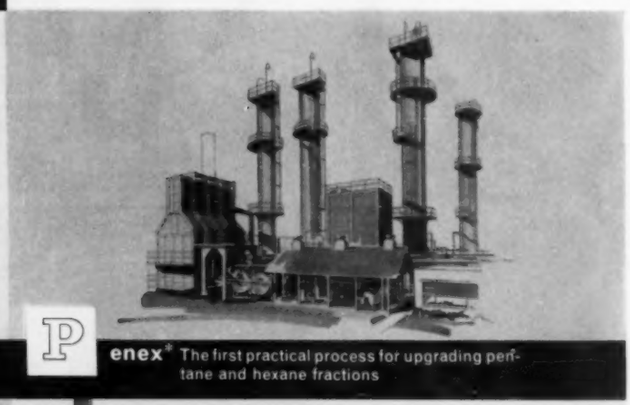

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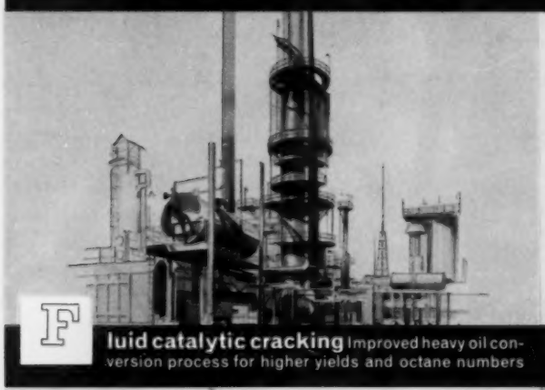

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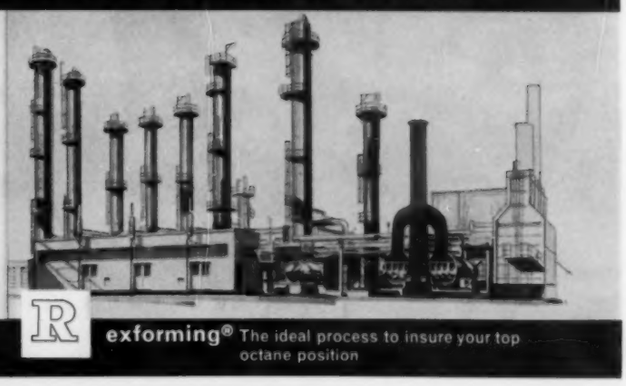

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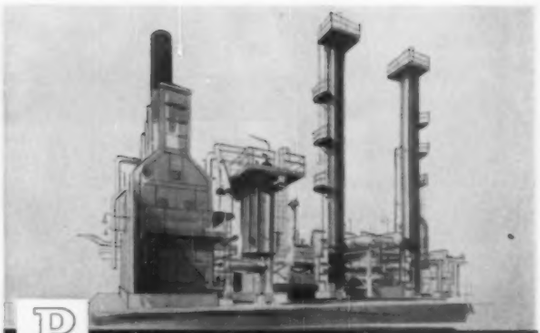

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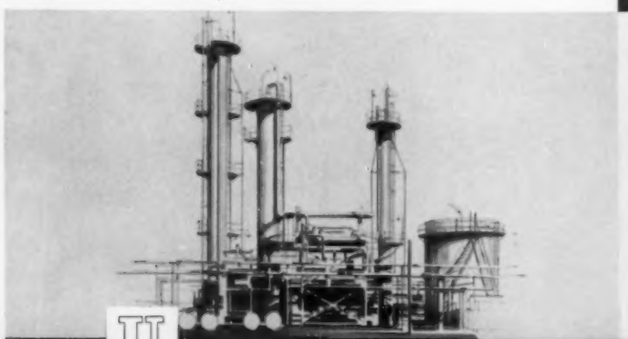

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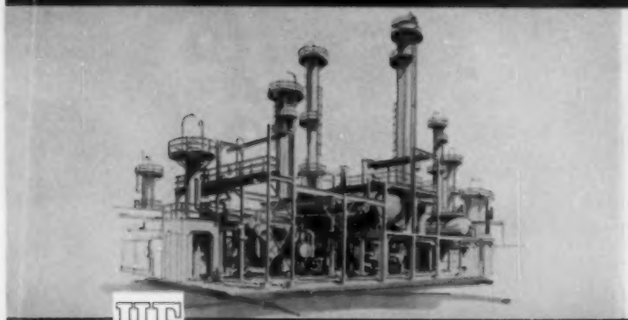

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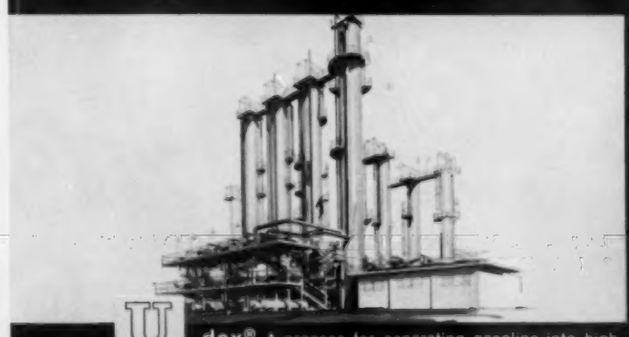

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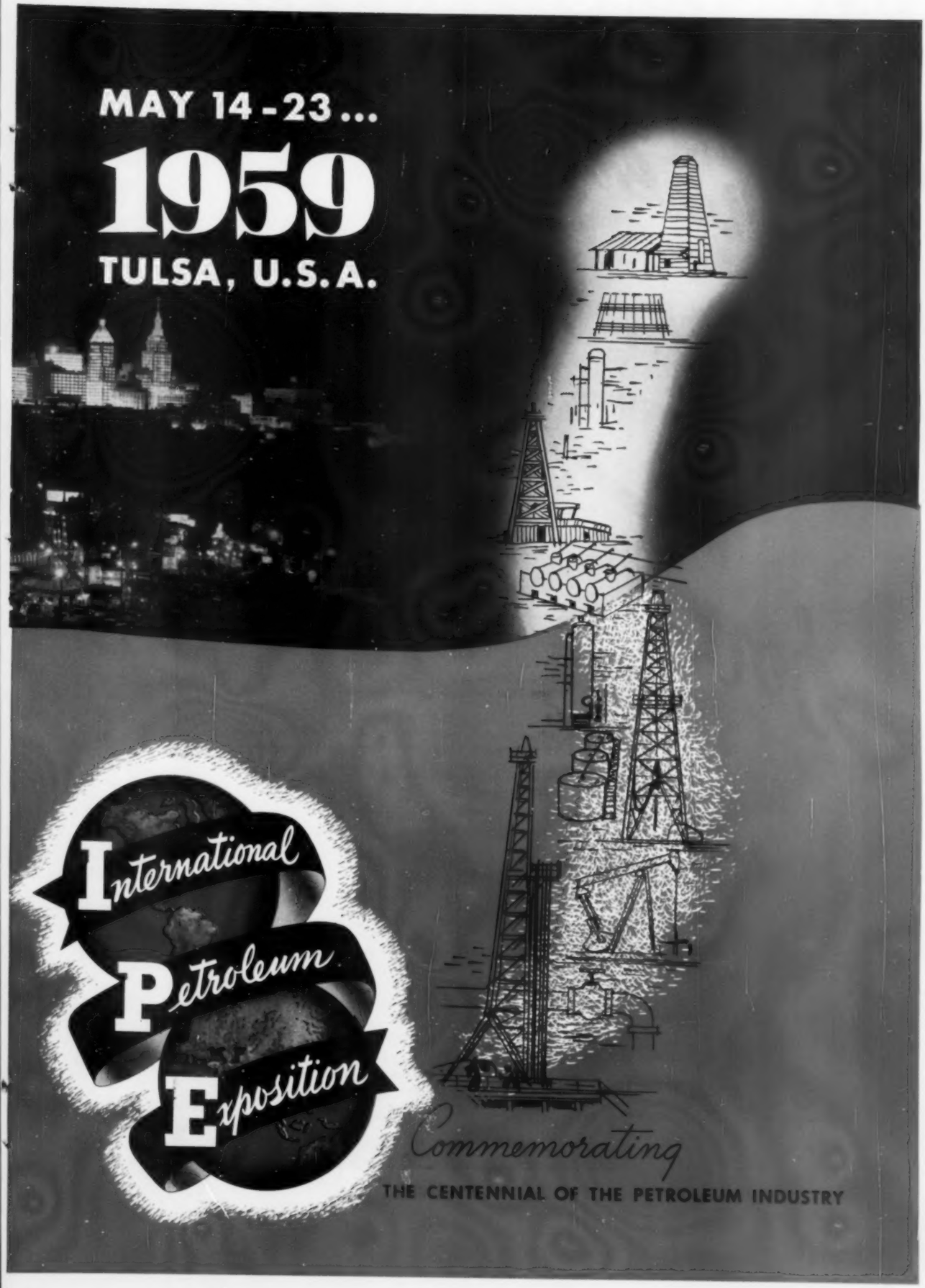
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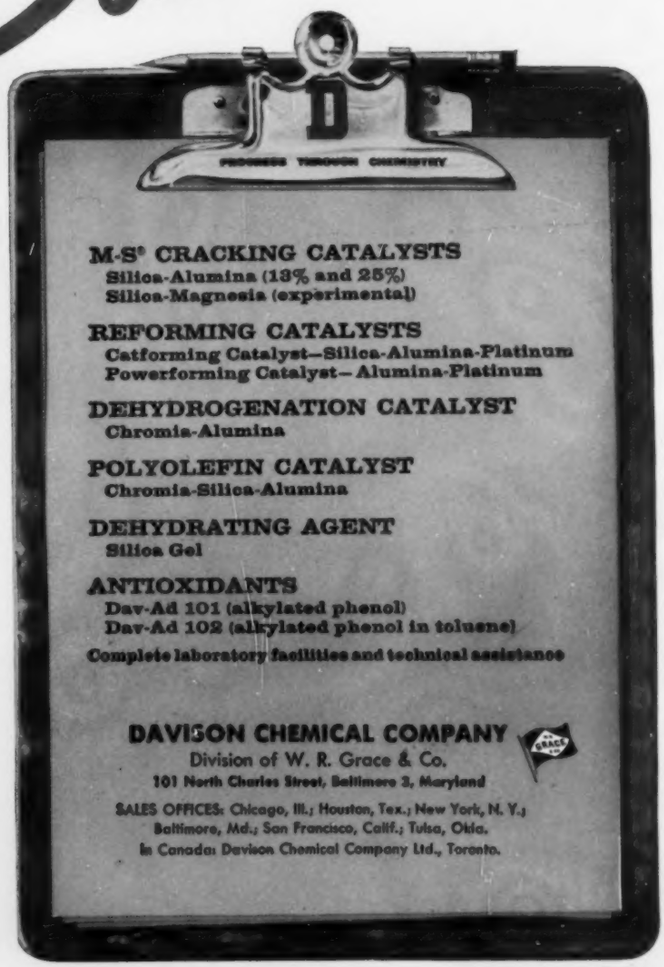
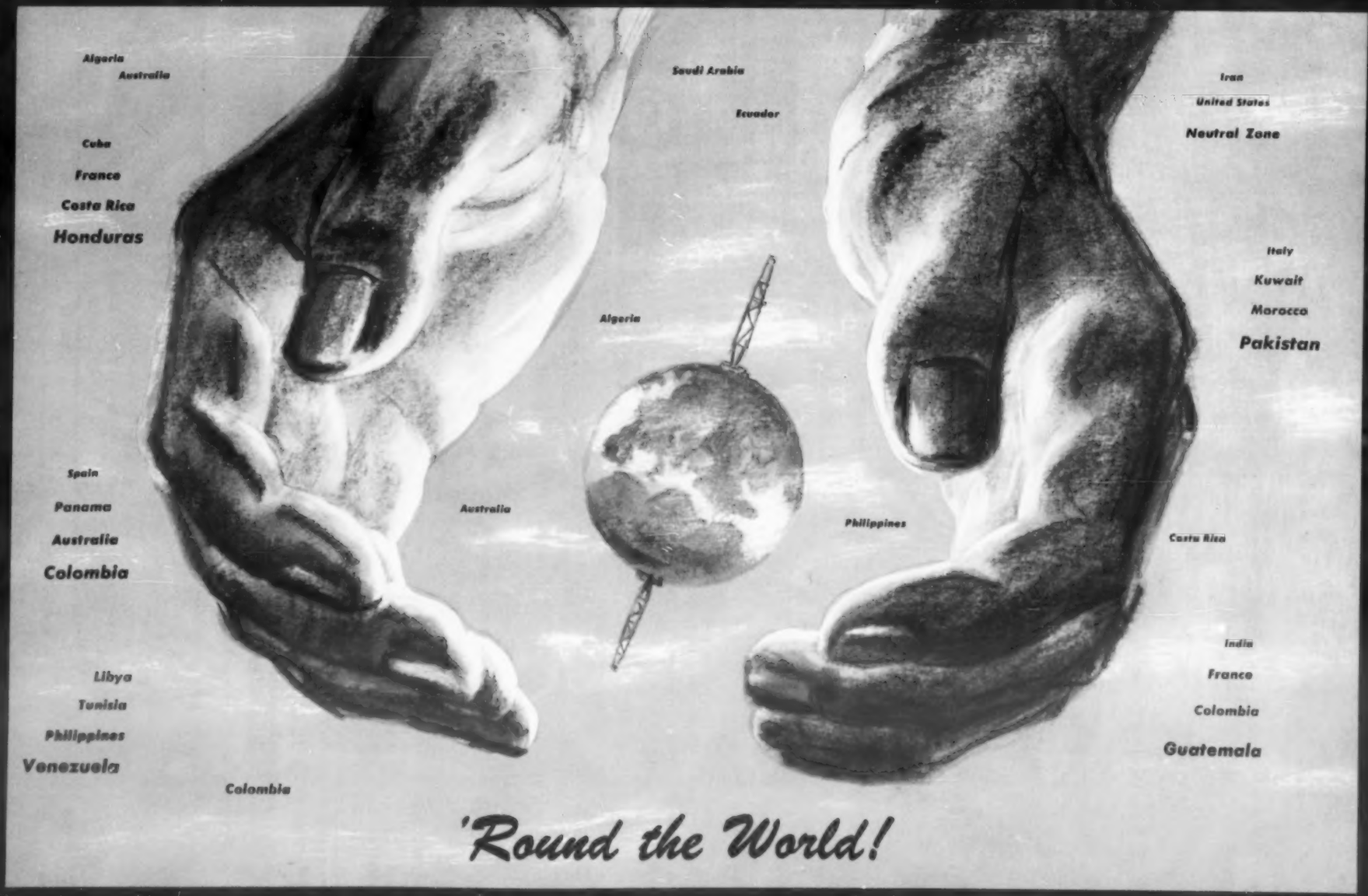


# OIL LAWS — CONCESSION CONTRACTS

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# NORTH AMERICA

## PHYSICAL DEVELOPMENT

**Exploration:** Interest centered on *Alaska*, following Richfield discovery. In *Canada*, no major fields were found in 1957; but an Ordovician discovery, the first in Canada, was made at Hummingbird (in Saskatchewan). Exporatory drilling in the *United States* declined slightly. *Mexico* found no major fields, but the San Andres discovery may prove to be important. **Production:** Total production rose to 7,899,200 b/d. The United States, Canada, and Mexico all showed higher production levels during the Suez crisis; then cut back.

**NORTH AMERICA—CRUDE-OIL PRODUCTION AND RESERVES**

| | Production 1957 (Barrels Per Day) | Reserves (a) (Millions of Barrels) |
|---|---|---|
| Canada | 499,200 | 3,600 |
| Mexico | 250,000 | 3,000 |
| United States | 7,150,000 | 30,500 |
| Totals | 7,899,200 | 37,100 |

a Estimated for each country as of the latest data available.

**Refining:** Capacity increased sharply, with additions made in all countries except Alaska.

**REFINERIES AND CAPACITY—NORTH AMERICA**

| Name of Country | Number of Plants | Crude Capacity (Barrels Daily) | Cracking Capacity (Barrels Daily) |
|---|---|---|---|
| Canada | 43 | 704,350 | 352,825TC |
| Mexico | 8 | 340,000 | 46,500TC |
| United States | 320 | 8,922,000 | 5,100,000TC |
| Total North America | 371 | 9,966,350 | 5,499,325 |

Under cracking capacity to indicate type: T—Thermal. C—Catalytic.

**Consumption:** Overall increase for North America was about 4.6% during 1957—considerably slower expansion than in previous years. The percentage rate of growth is less than half that of the world outside North America.

## OIL LAWS

No changes occurred in the basic regulation of the North American oil industry in 1957. The principal event was the formulation of "voluntary" import curbs in the USA, which has not yet attained the status of law.

## NATIONAL FACTORS

Heavy attacks were made on the oil industry within the United States. Nationalistic sentiment again reasserted itself in Mexico. Canada shows considerable resentment of USA import curbs. END.

**NORTH AMERICA—ESTIMATED CONSUMPTION OF PETROLEUM PRODUCTS**

(Crude-Equivalent Basis—Thousands of Barrels Per Day)

| Country | 1957 | % Change 1957 Over 1956 |
|---|---|---|
| Canada | 771 | + 7.0 |
| Mexico | 299 | +16.8 |
| United States* | 9,107 | — 4.0 |
| Total North America | 10,177 | + 4.6 |

*Excluding Alaska and the Hawaiian Islands.

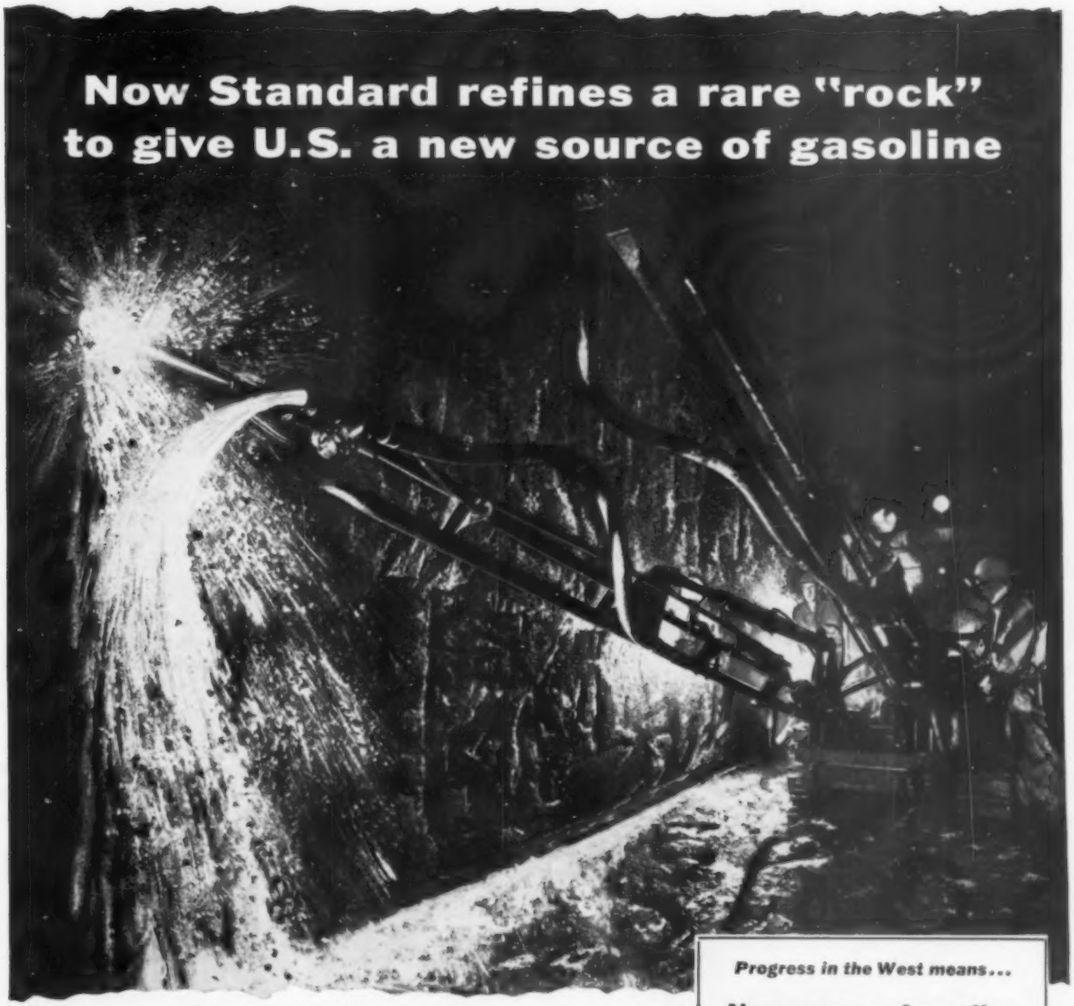
**ESTIMATED DOMESTIC DEMAND FOR MAJOR PRODUCTS, 1956**

(Thousands of Barrels)

| Country | Motor Fuel | Kerosine | Distillate Fuel Oil | Residual Fuel Oil | Lubricants | Total |
|---|---|---|---|---|---|---|
| **NORTH AMERICA and CARIBBEAN** | | | | | | |
| Alaska and Hawaii | 5,650 | 140 | 2,500 | 7,470 | 130 | 15,890 |
| Canada | 88,198 | 16,124 | 66,215 | 56,550 | 3,348 | 230,435 |
| Costa Rica | 400 | 50 | 350 | 340 | 20 | 1,160 |
| Cuba | 5,821 | 969 | 2,709 | 10,695 | 294 | 20,488 |
| Dominica | 740 | 100 | 400 | 800 | 50 | 2,090 |
| Guatemala | 870 | 150 | 354 | 1,053 | 35 | 2,462 |
| Haiti | 350 | 30 | 250 | 130 | 4 | 764 |
| Jamaica | 620 | 170 | 660 | 2,110 | 30 | 3,590 |
| Mexico | 24,652 | 8,678 | 9,961 | 31,247 | 1,016 | 75,554 |
| Nicaragua | 440 | 100 | 360 | 90 | 10 | 1,000 |
| Panama, Canal Zone | 400 | 20 | 2,420 | 4,200 | 10 | 7,050 |
| Panama, Republic | 686 | 164 | 240 | 600 | 20 | 1,710 |
| Puerto Rico | 4,000 | 750 | 1,000 | 4,500 | 80 | 10,330 |
| Salvador | 560 | 150 | 130 | 450 | 20 | 1,310 |
| Trinidad | 692 | 216 | 2,170 | 8,400 | 39 | 11,517 |
| United States | 1,377,544 | 117,292 | 616,007 | 561,691 | 43,934 | 2,716,468 |
| TOTAL ABOVE | 1,511,623 | 145,103 | 705,726 | 690,326 | 49,040 | 3,101,818 |
| **SOUTH AMERICA** | | | | | | |
| Argentina | 14,650 | 8,142 | 13,500 | 42,200 | 1,397 | 79,909 |
| Bolivia | 710 | 225 | 329 | 725 | 10 | 1,999 |
| Brazil | 25,516 | 4,854 | 12,102 | 27,357 | 1,368 | 71,197 |
| Chile | 3,862 | 1,324 | 2,353 | 6,820 | 190 | 14,549 |
| Colombia | 7,782 | 1,722 | 2,423 | 3,756 | 260 | 15,943 |
| Ecuador | 1,221 | 206 | 430 | 890 | 30 | 2,777 |
| Paraguay | 248 | 72 | 86 | 69 | 13 | 488 |
| Peru | 5,217 | 2,046 | 2,369 | 3,967 | 71 | 13,670 |
| Uruguay | 2,269 | 1,260 | 1,478 | 5,103 | 60 | 10,170 |
| Venezuela | 11,768 | 3,650 | 7,579 | 21,401 | 416 | 44,814 |
| TOTAL ABOVE | 73,243 | 23,501 | 42,649 | 112,308 | 3,815 | 255,516 |
| **WESTERN EUROPE** | | | | | | |
| Austria | 2,891 | 166 | 2,492 | 6,700 | 557 | 12,806 |
| Belgium, Luxembourg | 9,280 | 1,497 | 11,570 | 14,800 | 850 | 37,997 |
| Denmark | 6,345 | 896 | 6,641 | 12,113 | 357 | 26,352 |
| Finland | 3,100 | 560 | 2,800 | 3,560 | 190 | 10,210 |
| France | 42,800 | 862 | 28,530 | 62,500 | 3,549 | 138,241 |
| Germany, western | 28,436 | 473 | 30,541 | 36,482 | 3,899 | 99,831 |
| Greece | 2,200 | 810 | 3,200 | 4,800 | 150 | 11,160 |
| Iceland | 500 | 35 | 800 | 900 | 30 | 2,265 |
| Ireland | 3,285 | 828 | 1,380 | 3,553 | 153 | 9,199 |
| Italy, Trieste | 12,708 | 1,279 | 14,500 | 49,800 | 1,344 | 79,631 |
| Netherlands | 9,576 | 2,200 | 14,867 | 26,434 | 900 | 53,977 |
| Norway | 3,061 | 486 | 7,456 | 9,400 | 320 | 20,723 |
| Portugal | 1,996 | 1,656 | 2,700 | 3,637 | 168 | 10,157 |
| Spain | 5,851 | 1,390 | 5,646 | 11,349 | 600 | 24,836 |
| Sweden | 10,403 | 3,666 | 23,933 | 28,100 | 850 | 66,952 |
| Switzerland | 5,440 | 350 | 9,840 | 3,221 | 350 | 19,201 |
| United Kingdom | 73,030 | 11,059 | 39,478 | 83,210 | 6,356 | 213,133 |
| TOTAL ABOVE | 220,902 | 28,213 | 206,374 | 360,559 | 20,623 | 836,671 |
| **MIDDLE EAST** | | | | | | |
| Bahrain | 257 | 80 | 1,360 | 3,747 | 8 | 5,452 |
| Iraq | 1,621 | 1,604 | 1,746 | 4,200 | 100 | 9,271 |
| Israel | 1,785 | 1,263 | 1,596 | 4,542 | 90 | 9,276 |
| Kuwait | 629 | 148 | 835 | 8,894 | 5 | 10,511 |
| Saudi Arabia | 1,583 | 337 | 2,170 | 9,665 | 20 | 13,775 |
| Syria-Lebanon-Jordan | 2,200 | 1,100 | 3,100 | 3,600 | N.A. | 10,000 |
| Turkey | 3,300 | 1,600 | 3,100 | 1,200 | 300 | 9,500 |
| TOTAL ABOVE | 11,375 | 6,132 | 13,907 | 35,848 | 523 | 67,785 |
| **ASIA** | | | | | | |
| Burma | 950 | 440 | 630 | 250 | 100 | 2,370 |
| Ceylon | 1,200 | 780 | 1,500 | 3,000 | 70 | 6,550 |
| Formosa | 1,200 | 300 | 750 | 1,700 | 100 | 4,050 |
| India | 8,790 | 11,700 | 7,200 | 7,600 | 1,040 | 36,330 |
| Indo-China | 2,000 | 490 | 650 | 700 | 100 | 3,940 |
| Japan | 19,431 | 4,485 | 8,000 | 46,500 | 3,120 | 81,536 |
| Malaya | 3,150 | 720 | 5,900 | 14,900 | 200 | 24,870 |
| Pakistan | 1,260 | 1,570 | 2,963 | 5,887 | 240 | 11,920 |
| Thailand | 2,150 | 740 | 1,800 | 1,160 | 190 | 6,040 |
| TOTAL ABOVE | 40,131 | 21,225 | 29,393 | 81,697 | 5,160 | 177,606 |
| **AFRICA** | | | | | | |
| Algeria | 2,351 | 620 | 3,258 | 5,122 | 154 | 11,505 |
| Belgian Congo | 1,750 | 260 | 1,100 | 90 | 150 | 3,350 |
| Egypt | 2,674 | 6,014 | 4,290 | 16,350 | 340 | 29,668 |
| Ethiopa | 350 | 30 | 50* | N.A. | 40 | 470 |
| Fr. Equator, Africa | 500 | 90 | 200* | N.A. | 30 | 820 |
| Ghana | 1,000 | 250 | 700 | 300 | 70 | 2,320 |
| Kenya | 1,300 | 300 | 4,400* | N.A. | 70 | 6,070 |
| Liberia | 70 | 20 | 50 | — | 8 | 148 |
| Madagascar | 480 | 120 | 200 | 20 | 80 | 900 |
| Morocco | 3,043 | 448 | 1,400 | 1,800 | 100 | 6,791 |
| Nigeria | 1,900 | 600 | 650 | 250 | 70 | 3,470 |
| Rhodesia and Nyasaland | 1,920 | 310 | 900* | N.A. | 140 | 3,270 |
| Sudan | 650 | 160 | 450 | 760 | 40 | 2,060 |
| Tanganyika | 600 | 200 | 950* | N.A. | 40 | 1,790 |
| Tunisia | 766 | 295 | 887 | 1,475 | 50 | 3,473 |
| Uganda | 550 | 180 | 250* | N.A. | 30 | 1,010 |
| Union So. Africa | 12,900 | 4,300 | 6,000 | 4,400 | 800 | 28,400 |
| TOTAL ABOVE | 32,804 | 14,197 | 25,735 | 30,567 | 2,172 | 105,475 |
| **OCEANIA** | | | | | | |
| Australia | 28,769 | 3,599 | 10,568 | 16,660 | 1,367 | 60,963 |
| Indonesia | 4,990 | 6,455 | 4,700 | 4,900 | 228 | 21,273 |
| New Caledonia | 100 | N.A. | 270* | N.A. | 20 | 390 |
| New Zealand | 7,180 | 270 | 2,190 | 2,180 | 260 | 12,080 |
| Philippines | 5,541 | 1,522 | 3,305 | 3,524 | 342 | 14,234 |
| TOTAL ABOVE | 46,580 | 11,846 | 21,033 | 27,264 | 2,217 | 108,940 |
| **TOTAL ABOVE COUNTRIES** | 1,936,658 | 250,217 | 1,044,817 | 1,338,569 | 83,550 | 4,653,811 |
| Daily Average | 5,291 | 684 | 2,855 | 3,657 | 228 | 12,715 |

*May include unreported amount of residual fuel oil. N.A.—Not available. Source: U. S. Bureau of Mines.

# Now Standard refines a rare "rock" to give U.S. a new source of gasoline



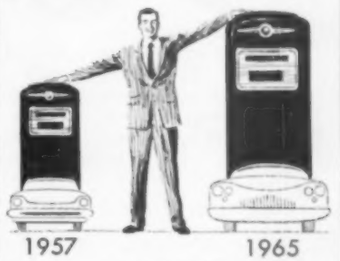
*High pressure water jet shatters solid Gilsonite. Flume hose washes particles down mine floor to pipeline.*

**Petroleum products are now being made without crude oil.** Standard found the answer in a rare hydrocarbon called Gilsonite. But it took $16,000,000 and a vast research program to do it. Deep in the mountains of Utah our scientists worked out a better, faster way to mine Gilsonite. Meanwhile our engineers designed the nation's first pipeline capable of carrying solids suspended in water . . . over rugged terrain to a spot 72 miles away.

There Standard* built the nation's first privately financed refinery to make petroleum products from a material other than crude oil. Today that refinery turns Gilsonite into high octane gasoline for motorists, and the purest coke known for making steel, aluminum and other metals. In our country's search for new sources of fuel, the development of Gilsonite is a major breakthrough. It means the equivalent of 100,000,000 barrels of oil added to U.S. underground reserves—important help in meeting our country's growing petroleum needs.

***Progress in the West means...***

**New sources of gasoline to fuel 5½ million more motor vehicles by 1965†**




*† In 11 Western States*

**Through American Gilsonite Company, a Standard affiliate*

**STANDARD OIL COMPANY OF CALIFORNIA**
***plans ahead to serve you better***

# Valves to do the job, and do it right!

Regardless of your individual requirement, whether it be specialized or "run-of-the-mill," there is a PACIFIC valve to fit your need– now! Quality steel valves are readily available from factory or warehouse stocks, valves that offer you engineered features for higher operational efficiency . . . longer service . . . and lower maintenance cost.

Add to these facts that you can choose your desired body-bonnet material combinations for economy. You then realize the complete service offered by PACIFIC VALVES.

The more particular you are in selecting dependable valves, the more likely you are to choose PACIFIC valves.



**NEW HIGH IN VALVE PERFORMANCE... PACIFIC Y-Globe valves are particularly adaptable to installations where the service requires maximum flow, minimum pressure drop and positive bubble-tight closure, or when the open-closed cycle is required to be in seconds or milliseconds. Y-Globe valves are available in 150, 300, 600, 1500 and 2500 lb. pressure series.**

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**3201 WALNUT AVENUE, LONG BEACH 7, CALIFORNIA**

***Sales Offices in Most Principal Cities***

# ALASKA

## PHYSICAL DEVELOPMENT

**Exploration:** Richfield Oil Corp. made a 900 b/d discovery on the Kenai Peninsula, 40 miles southwest of Anchorage, during September 1957. The well flowed 33 API gravity oil and 122 mcf gas through a 1½-in. bean. Drilled to 12,384 ft., it touched off a wave of excitement and leasing such as Alaska never has seen before. It is the first real find in more than 55 years of exploration—which began with shallow wells drilled early in the 1900's.

Richfield's Swanson River Unit 1 well was plugged back and 5½-in. casing set at 12,000 ft. Production is from a perforated interval 11,150 ft. to 11,215 ft. It is now producing 360 b/d. Standard Oil Co. of California purchased a joint interest, and will operate the discovery—spending $30 million on the 71,600-acre area. Richfield has an 89½% interest; the rest was held by Union Oil Co. of California and The Ohio Oil Co. A second well, two miles south, was drilling as of mid-December 1957.

The Richfield discovery has been estimated at a billion barrels. The structure is unofficially reported to cover more than 100,000 acres, exceeding the 71,680-acre lease held by Richfield and Socal.

Other explorers were not so lucky. Colorado Oil & Gas Co. abandoned 1 Yakutat at 9,314 ft. because of mechanical difficulties. 1-A Yakutat was spudded 3½ miles east during mid-1957—with no results reported as of this writing.

Humble Oil & Refining Co. and Shell Oil Co. joined forces for exploration under a joint agreement to explore in the Kanatak area of southwestern Alaska. A wildcat was being drilled (mid-December) at Cold Bay—projected to 12,000 ft.

Phillips Petroleum Co. and Kerr-McGee Oil Industries Inc. continued their joint effort described in detail in *World Petroleum Report 1957*. Their latest well, Sullivan No. 2, was abandoned and plugged. It went to 12,054 ft., and had a number of small shows.

Fairbanks Oil & Gas Co.—with about three million acres under lease—is doing some seismic work through Global Enterprises Inc., backed by P. G. Benedum, president of Hiawatha Oil & Gas Co.

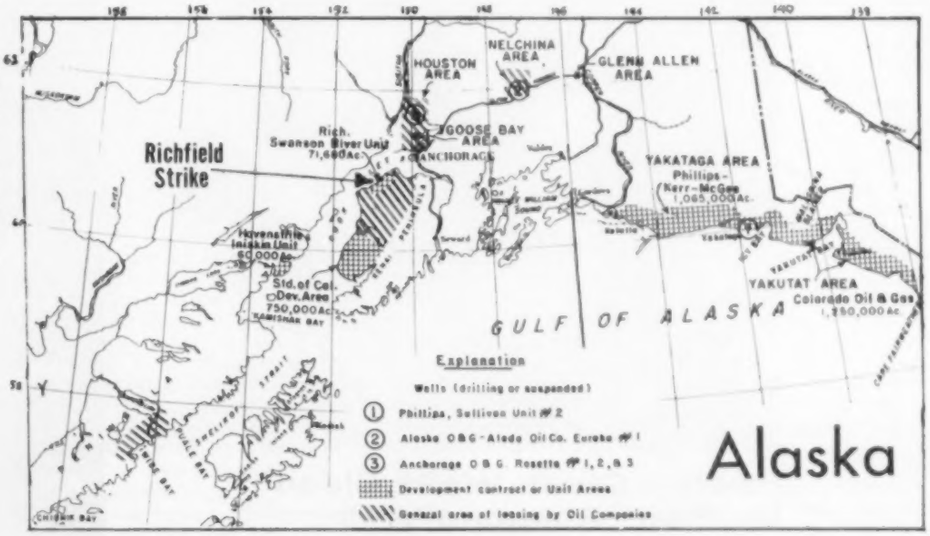
Near Anchorage, Anchorage Oil & Gas Development Inc. continued testing at Rosetta No. 1—with gas shows reported. Rosetta No. 3 was drilled one mile east—with no commercial shows.

R. E. Havenstrite, Los Angeles independent, continued testing the Fitz Creek anticline, but abandoned his second well at 9,747 ft.

H. L. Hunt interests filed for 843,560 acres in the Kanik area of eastern Alaska during November 1957—largest single filing to that date.

**Production, Refining, Transportation:** There has been no production in Alaska since the depleted Katalla field gave out. Neither has there been any refining; but during 1957 a joint venture, Alaska-Yukon Refiners & Distributors Ltd., announced plans for a $6 million refinery at Haines, plus two pipelines. One line, costing $3.5 million, would link Haines and the wartime-built Canol pipeline. The other would go from Tok Juncton—far up the Canol line—to Anchorage. Under this plan, Royalite Oil Co., a fully integrated Canadian concern, would handle marketing. It estimates civilian requirements in the Yukon area (there are extensive military requirements, but these are not known) at about 652 b/d. Combined consumption for Alaska and the Yukon is estimated by the companies at 19,289 b/d—including motor and aviation gasoline, diesel oils, and other products. Taxable gasoline sales in the territory were 4,631 b/d in 1955. These are the first consumption figures thus far on Alaska, and presumably exclude the military.

**Reserves:** The government has estimated reserves in its Naval Petroleum Reserve No. 4 (see *WPR 1957*) at 500,000 bbl, and natural-gas reserves at 231.7 to 233.7 billion cubic feet as of mid-1956. No changes are known to have occurred in that estimate.




## OIL LAWS

Regulation of oil exploration and production is essentially the same as in continental United States—with some modifications as to area. These are covered in the accompanying summary and in *WPR 1957*. The first major change, since the area was opened for large-scale leasing in 1950, occurred in 1957. Secretary of the Interior Seaton revoked 14-year-old Public Land Order No. 82, which had reserved 48.8 million acres in northern Alaska to the government. There now will be available: (1) 16,000 acres in Gubik gas field to competitive leasing—open April 1, 1958—plus four million acres on a first-come first-serve basis; (2) by September 1, 1958, an additional 16 million acres, lying on either side of the Naval Petroleum Reserve, will be opened on a first-come first-serve basis. The naval reserve itself will not be opened, but the U. S. Navy reportedly is interested in contracting it for development. A two-mile buffer zone will be maintained where no oil operations will be permitted.

About nine million acres are reserved for wild-life protection. Criticism immediately developed from a number of oil companies which protested the restriction. Seaton said the area would not be open to the regular leasing procedure of going to the first claimant, but mining permits would be issued for oil.

Offshore areas of Alaska are closed, but legislation is under consideration to open them. A bill recently was offered to put them under USA Mineral Leasing Act of 1920. Interior opposes a single bill applying both to inland and offshore waters, and favors separate bills.

## NATIONAL FACTORS

The principal disadvantages to Alaskan operation have been high drilling costs (more than five times California levels) and high operating costs. A low level of economic development and scant population—plus labor costs twice USA levels and a difficult terrain—make for expensive operations. The advantages are principally location, since Alaska is strategically located to supply the USA West Coast, a crude-short area.

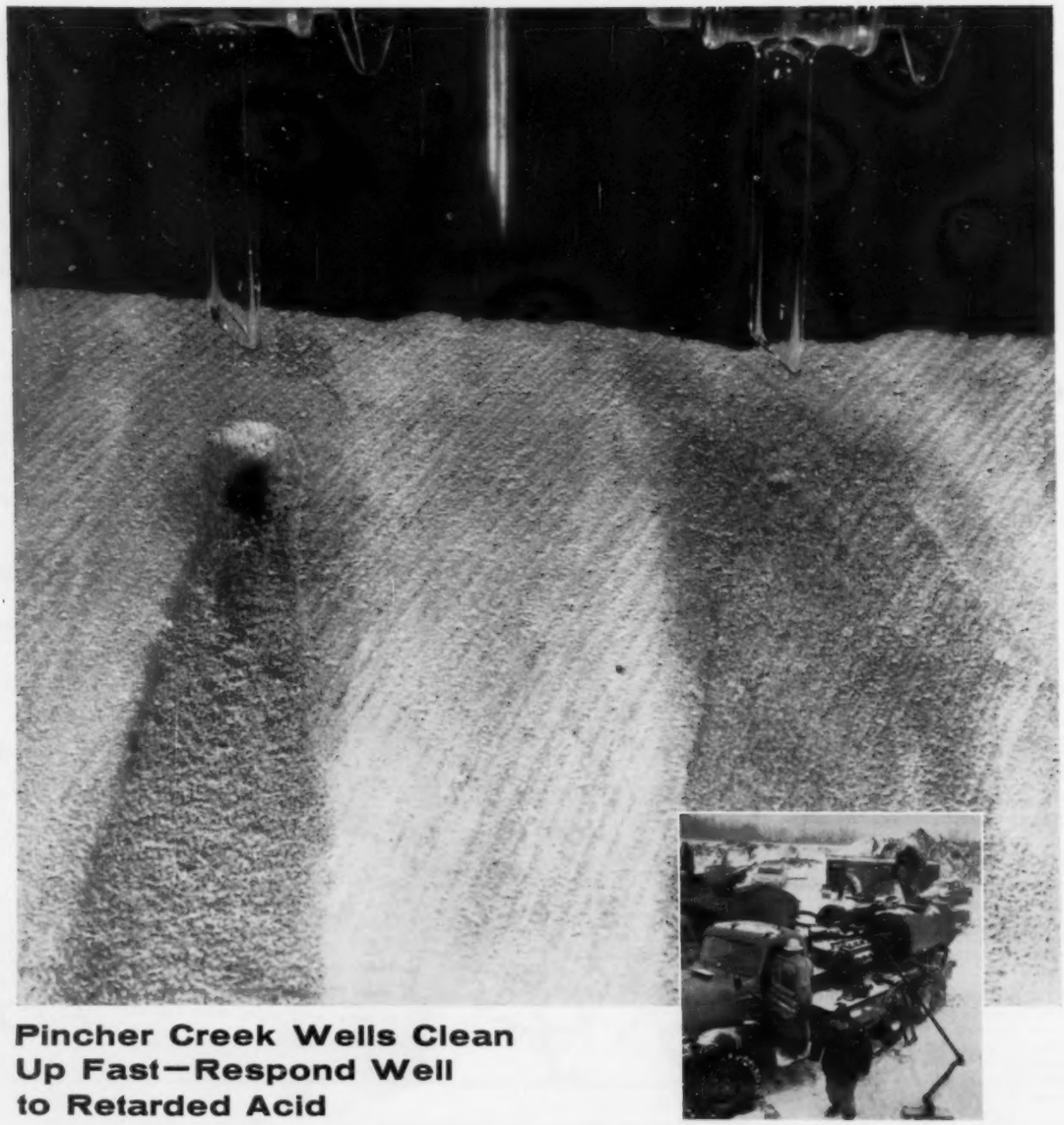
Statehood for Alaska would solve part of the problem, since the present government system—by commission—is most unsatisfactory. However, chances for statehood are slim. END

## Oil Law Summary★

**EXPLORATION: Subsoil:** Almost all owned by US Federal Govt. **Duration:** 3 yrs. **Area:** 200,000 acres in Territory of Alaska. **Taxes:** None. No drilling operations may be begun before receiving exploitation rights.

**EXPLOITATION:** Divided into non-competitive and competitive leases. **Duration:** 5 yrs. for non-competitive leases, and so long thereafter as commercial production is obtained. If production is not obtained single extension of 5 yrs. may be given. If over a known structure, extension is two years. Competitive lease duration determined by bid. **Area:** Maximum 100,000 acres in Territory of Alaska. For competitive lease maximum 650 acres, on lands within known geologic structure of producing field. **Royalty:** 12½% non-competitive, but first commercial discovery in Alaska pays 5% for 10 years. On competitive leases, not less than 12½%. **Taxes:** On competitive leases, annual rental of $1.00 per acre. After discovery minimum royalty is $1.00 per acre in lieu of rental. If royalty paid is less than $1.00 per acre, lessee must pay difference. **Rental:** On non-competitive leases if outside producing field, 25 cents per acre during first year, second and third years no rental, for 4th and 5th years total 25 cents per acre, sixth and succeeding years 25 cents per acre. If within producing field $1.00 per acre if not committed to unitization plan. If in unitization plan, 25 cents per acre. **Bond:** $5,000 bond must be posted. Non-competitive leases file bond of $1,000. **Transfer:** Freely permitted to a person qualified to hold a lease, subject to approval by govt. **Surrender:** Any time, on statement all obligations have been fulfilled.

★Taken from *World Petroleum Legislation*, 304 Fifth Ave., N. Y. 20, N. Y. (see p. 37-38)



## Pincher Creek Wells Clean Up Fast—Respond Well to Retarded Acid

The Pincher Creek Field in Southwestern Alberta is one of the most prolific gas fields in Canada. Before acidizing, wells frequently reveal no commercial production. After acidizing with Retarded Acid, however, many of these wells have produced up to 30 million cubic feet of gas per day—plus over 1000 barrels of distillate.

A special addition agent in Retarded Acid delays the acid reaction rate during treatment. This enables the acid to work far back into the formation before spending completely. The large photograph above shows the slower reaction rate of Retarded Acid on the right as compared to regular acid on the left.

The acid used in Retarded Acid is not an emulsion. The retarding agent is designed to break automatically as the acid spends to give fast clean up. This is an important feature to Pincher Creek operators.

You may find that Retarded Acid is the best treatment for some of *your* wells. Call your nearest Dowell office or station in Canada for full information and service. Dowell Incorporated. District Office, Lancaster Building, Calgary, Alberta.

*Services for the oil industry* DOWELL

A SERVICE SUBSIDIARY OF THE DOW CHEMICAL COMPANY

# CANADA

## PHYSICAL DEVELOPMENT

**Exploration:** 1957 marks the 10th anniversary of Canada's oil boom, which began with the Leduc discovery in 1947. No major discoveries have been made since the Pembina find in 1953, but a series of good finds has kept exploratory activity high. In 1957, exploration declined a little; geophysical crews were down to 101 on July 15—below the 114 operating at that date in 1956. Completions were off too—down to about 3,000 in 1957, compared with 3,285 in 1956. The total at the end of August was 2,032 wells completed, against 2,038 at the same date in 1956.

1958 will be a similar year of problems, and exploration activity is estimated to be slightly lower than in 1957. Over the long run, however, prospects are bright. 7.5 billion barrels need to be discovered over the next 10 years to meet demand; this will require some 38,000 wells, amounting to 160 million feet of hole. These figures indicate a solid future for Canadian exploration.

*Alberta:* Attention during 1957 was focused on several outstanding discoveries—including Swan Hills, Edith Lake, Kaybob, and Virginia Hills, where Home-Union-Hudson's Bay Virginia Hills 9-20 was completed at 10,624 ft. The Innisfail oil pool discovery was likewise significant, and this find in west-central Alberta may be one of the most outstanding Devonian-reef discoveries of the past four years when the big trend has been to Cardium oil sand. Location is northeast of the Mississippian group of fields at Westward Ho and Sundre. Canadian Oil Companies Ltd. and The Calgary & Edmonton Corp. Ltd. are operators.

The Athabaska tar sands, location of an estimated 300 billion barrels of oil, have never been commercially produced, but during 1956 a $50 million program by Royalite Oil Co. and Can-Amera Oil Sands Development Co. went into operation with a new process.

*Saskatchewan:* Activity has been rising faster than in Alberta, due to the very high discovery ratio of about 3.6 to 1 or better—with low cost of wells and easier terrain. Main development is along the Mississippian Charles trend of southeastern Saskatchewan. Oil discoveries in 1957 numbered about 10 important ones—including Adelaide, Southeast Midway, Rocanville, Redvers, Parkman, North Browning, and Bellegarde.

One discovery considered particularly significant was the Hummingbird, first Ordovician discovery to be made in Canada.

*Manitoba:* Development drilling is almost completed, unless another wildcat discovery is made. Only a few locations remain to be drilled. Projection for 1958 is 100 wells, wildcat and development combined—about half 1957 total.

*British Columbia:* The gas finds in this area support the new Westcoast Transmission gas line which is supplying the West Coast. Recently, some oil has been found as well—with finds reported at Prespatou Creek, Blueberry, Halfway, Nontney, and Nig Creek.

Blueberry was particularly important. The Boundary Lake field was extended by a number of stepout wells.

*Northwest Territories and Yukon:* Only one discovery has been made in this extensive area, but interest is increasing. Thick sedimentary sections, believed favorable for oil and gas accumulations, exist in the area.

*Eastern Canada:* A fillip was given exploration by discoveries of natural gas in Quebec. At least 12 companies are engaged in exploration in the area, which is between Batiscan and Three Rivers, Quebec.

Bald Mountain Oil Co. discovered the first major gas reserve in March of 1957 in the Batiscan well at 2,197 ft.

**Production:** Canada has enjoyed a steady increase in production since 1946, but in 1957 for the first time production began to drop. The reasons included lower tanker rates and lowered market demand, both in Canada and in the USA. Alberta was especially hard hit because the lower tanker rates which came on when the Suez crisis was over eliminated the offshore shipments to California by re-admitting Far East crudes. The result was a lower production allowable in Alberta, which is subject to prorationing.

In Saskatchewan, production nearly doubled during 1957, however. There is no proration in Saskatchewan which, therefore, is free to produce as much as producers want. Also, light-gravity crude production in Saskatchewan's southeast corner is nearly 1,000 miles closer to Ontario and United States midwest markets than Alberta.

Canada's production has long lagged behind her potential. This gap is expected to rise to 775,000 b/d in 1960, when production will be up to 605,000 b/d, but productive capacity will then be 1,380,000 b/d—which means only 44% of capacity will be used, compared with about 55% at present. The situation will begin to correct itself by about 1970, according to forecasts made by Imperial Oil Ltd.

**Reserves:** Total proved Canadian reserves reached a record high of 3.1 billion barrels on December 31, 1956. During 1957, they increased by an estimated 500 million, to about 3.6 billion. They are estimated to reach 6.6 billion barrels by 1960, and 13.3 billion barrels by 1980.

**Natural Gas:** One of the brightest hopes of Canada's industry is the development of natural gas, which has shown a phenomenal increase with the construction of the two large gas lines, Westcoast Transmission and Trans-Canada Pipe Lines Ltd., running to the West and East Coasts, respectively.

Capital requirements for natural-gas transmission lines, distribution systems, and collateral operations will be about $2 billion over the five years from 1957 to 1961, according to industry estimates.

The hottest place for natural-gas discoveries in western Canada for the next few years is likely to be the Rocky Mountain foothills belt, which the proposed gas pipeline will traverse. Two discoveries of recent months are Shell Waterton Park and Texaco Castle River—both now being evaluated with stepout wells. Unofficial estimates place each reserve at better than one trillion cubic feet (1 mmmmcf).

Planned expansion in Canada's natural-gas industry will raise sales to about 2 billion cubic feet of gas by 1965, according to industry estimates. Expenditures are then estimated by the same source at $450 million, of which equipment to clean gas and extract byproducts will cost $200 million; about $100 million will be needed for drilling and for equipping wells to deliver gas, and another $150 million will be spent on gathering systems.

Reserves for all of Canada are about 28 trillion cubic feet of salable gas (as of November 1957). Based on past experience, reserves will be over 74 trillion cubic feet by 1980.

Prime Minister Diefenbaker told Commons late in October that a federal government decision on whether to allow export of prairie natural gas to the USA will await recommendations of the Borden commission assigned to study Canada's overall energy picture.

Shell Oil Co. has contracted to supply 200 mmcf per day of natural gas to a proposed $330 million pipeline from Alberta to California. Subject to governmental approval in both the USA and Canada, present plans call

**CANADA—PROVED LIQUID HYDROCARBON RESERVES (Barrels)**

| | As of Dec 31, 1956 | Changes during 1956 |
|---|---|---|
| CRUDE OIL | | |
| Northwest Territories | 53,258 | —449 |
| Alberta & British Columbia | 2,391,778 | 221,793 |
| Saskatchewan | 358,693 | 121,821 |
| Manitoba | 42,005 | —3,206 |
| Ontario and New Brunswick | 3,636 | —123 |
| TOTAL CRUDE OIL | 2,849,370 | 339,836 |
| NATURAL-GAS LIQUIDS | 279,934 | 32,849 |
| TOTAL LIQUID HYDROCARBONS IN CANADA | 3,129,304 | 372,685 |

**CANADA—NATURAL GAS PRODUCTION BY PROVINCES 1957**
(Thousands of Cubic Feet)

| Month | New Brunswick | Ontario | Saskatchewan | Alberta | British Columbia | Northwest Territories | CANADA |
|---|---|---|---|---|---|---|---|
| January | 23,693 | 2,012,897 | 1,568,166 | 18,960,834 | 30,023 | 2,574 | 22,598,187 |
| February | 19,357 | 1,854,355 | 1,270,048 | 16,277,738 | 54,500 | 2,198 | 19,478,196 |
| March | 19,883 | 1,722,225 | 1,218,203 | 15,189,002 | 112,447 | 2,209 | 18,263,969 |
| April | 17,218 | 1,133,768 | 921,507 | 16,345,363 | 86,358 | 1,453 | 18,505,667 |
| May | 15,538 | 974,387 | 721,550 | 12,089,809 | 64,521 | 941 | 13,866,746 |
| June | 13,146 | 793,415 | 779,084 | 10,948,505 | 10,922 | 1,169 | 12,546,241 |
| July | 12,166 | 590,152 | 850,336 | 10,902,238 | 33,624 | 1,092 | 12,389,608 |
| Total seven months | 121,001 | 9,081,199 | 7,328,894 | 100,713,489 | 392,395 | 11,636 | 117,648,614 |

for operation of the line late in 1960, with an initial daily delivery of 450 mmcf. Gas will be purchased for Pacific Gas & Electric Co., San Francisco, for distribution in the California market. Associated with PG&E in the project are Canadian Western Natural Gas Co., Calgary; Northwestern Utilities Ltd., Edmonton; and Canadian Bechtel Ltd. Westcoast has proposed a similar line.

**Transportation:** There are two major crude lines in Canada, as covered in *World Petroleum Report 1957*. These are the Trans Mountain line going to the West Coast, and the Interprovincial line running toward East Canada. Trans Mountain raised its capacity to 240,000 b/d during the summer of 1957 by the addition of pumping stations. Interprovincial completed its 156-mile 20-in. extension beyond Sarnia to Port Credit in the Toronto region during September 1957, and deliveries began during October.

A new company was formed for transportation of oil from the Athabaska tar-sand region. The company is The Bituminous Oil Pipeline Co., which will build a 250-mile line from Athabaska to Edmonton. Size of the line was not announced. It will handle production from Royalite's $50 million development plan in this area.

A new crude line is being studied from the Peace River region of northern British Columbia to tidewater at Bella Coola in Vancouver. The line would be about 450 miles long.

Total pipeline mileage—both oil and gas lines but not including distribution, sale laterals, and line looping—was about 9,000 miles at the end of 1957. About 2,200 miles were laid in 1957, not including gas lines and looping, which would make a total of 5,000 miles in 1957.

Investment in pipelines is estimated at 2.25 billion dollars on construction of 15,000 miles of new pipeline during the next 10 years. The biggest part of this is in gas-line construction.

**Refining:** During 1957, 42,300 b/d was added to Canadian refining capacity.

*Future Growth*: About 63% of Canada's refining capacity lies in eastern Canada—especially around Toronto, Sarnia, and Montreal. These refineries operate largely on imported crude. Based on demand forecasts made by company sources within Canada, refinery runs will have to increase sharply during the next two decades to keep abreast of Canadian consumption.

**Marketing:** *Energy Demand*—Based on estimates by the Royal Commission on Canada's Economic Prospects (Gordon commission), natural gas consumption may increase 10 or more times within the next quarter-century. Studies indicate Canada's energy requirements will more than double, and that demand for petroleum will triple to a total of about 1,753,000 b/d during 1980. In the same period, demand for Canadian crude will multiply by 6 to 8 times, from present levels, to between 2 and 3 million barrels daily.

Overall energy use is estimated to rise to 6,084 billion Btu's in 1980, an increase of 118% over 1955. Petroleum in 1980 would supply 61.5% of this, an increase of 181% over the period.

*Consumption*—The Canadian market has expanded remarkably fast, under the impulse of a fast economic growth and supporting refinery construction. The most prominent influence has been the shift to oil from other fuels for home heating. In 1941, less than 3% of Canada's households were heated by oil. This had increased just slightly over half by 1956. Dieselization of railroads is about half completed now, and is being carried out at an increasing rate. These two factors have raised the level of middle distillates.

The increase in Canada's consumption has averaged about 11% yearly during the postwar period, beginning in 1952. During 1957, the increase was less, and is estimated at about 7%—raising the level of domestic consumption to about 771,470 b/d. 1958 is estimated to be a similarly retarded year, and increase in demand will about equal the 1957 increase, according to current estimates.

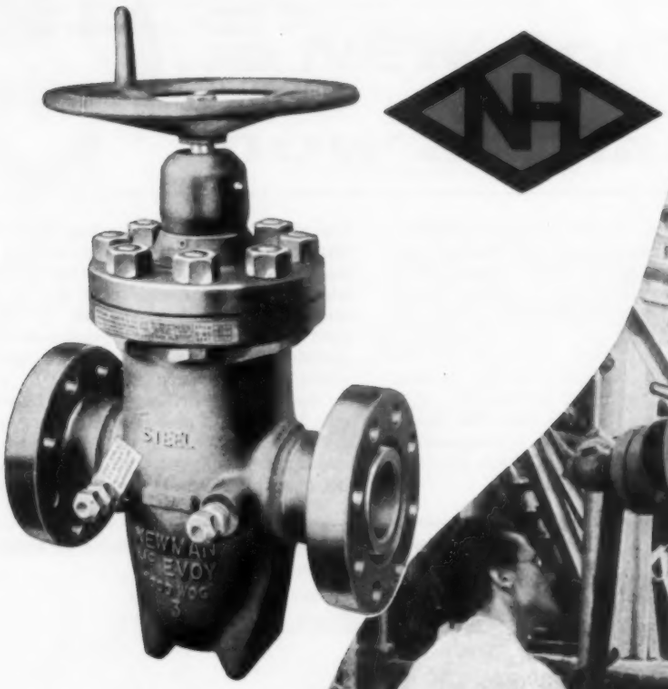
During the next 20 years demand for middle distillates is expected to continue its present rate of increase through 1960, but in following years it will be slowed down by completion of railway dieselization and competition from natural gas.

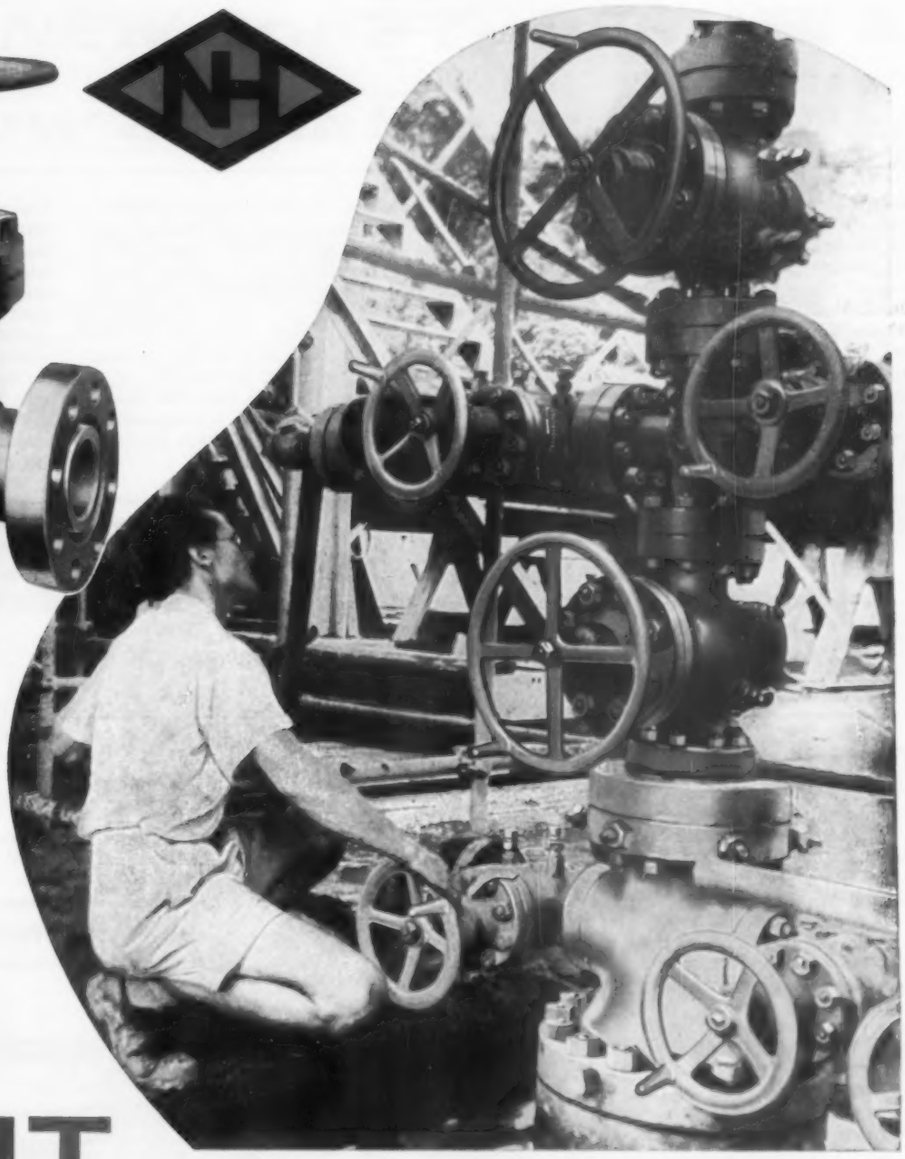
As may be seen by accompanying tables, demand in eastern Canada is over half that for Canada as a whole. This market is expected to grow relatively and is, therefore, of great importance to the growth of the petroleum industry in Canada. It is especially important to Canada's oil industry since the USA market for Canadian crude is now restricted. The recent West Coast import limitation imposed in the United States effectively reduces that market to Canadian suppliers—the only alternative market left is the eastern Canada market. To date, there is no transportation of sufficient volume to handle the amounts necessary. However, Canada has imported for many years about half its requirements on the East Coast, and this market is available to suppliers in western Canada, given transportation facilities. The problem is essentially one of price, for on the East Coast Canadian crude would be in direct competition with imports from Venezuela and the Middle East. It is probable this conflict would result in downward adjustment in the price of Canadian crude.

**GAS PIPELINES IN CANADA**

(As of 3/1/57)

| Company | Length (miles) | Diameter (inches) | Status | Begins | Terminus |
|---|---|---|---|---|---|
| Ajax Alberta Pipeline Ltd. | 52 | 10, 8, 6, 4, 3 | Complete | Morinville-St. Albert | Edmonton |
| Alberta Gas Trunk Line Co. Ltd. | | | Began 1957. Complete 1960 | | Gathering agent in Alberta province for Trans-Canada Pipe Lines Ltd. |
| British Columbia Electric Co. Ltd. | 1,108 | All sizes up to 30 | Complete | Huntingdon, B.C. | Lower Midland, B.C. |
| Canadian Montana Pipe Line | 75 | 16 | Complete | Manyberries gas field | Shelby, Mont. |
| Canadian Western Natural Gas Co. Ltd. | 1,422.5 | 1¼ to 16 | Complete | Nevis, Jumping Pound, Turner Valley, Bow Island and Foremost gas fields | Line runs throughout southern Alberta |
| Grande Prairie Transmission Co. Ltd. | 52 | 4½ OD | Complete | Rycroft field | Grande Prairie, Alt. |
| Inland Natural Gas Co. Ltd. | 329 | 12, 10, 6 | Scheduled completion Sept. '57 | Savona, B.C. | Nelson, B.C. |
| Mid-Western Industrial Pipelines Ltd. | 10.4 | 8, 6, 4, 3 | In operation | Ft. Saskatchewan gas field | Ft. Saskatchewan, Alt. |
| Mid-Western Industrial Pipelines (Redwater) Ltd. | 18.5 | 6⅝ | Operation started Dec. '56 | Redwater, Alt. | Ft. Saskatchewan, Alt. |
| Mid-Western Industrial Pipelines (Wabamun) Ltd. | 38 | 10¾, 6⅝ | In operation | Alexander Indian Reserve | Wabamun, Alt. |
| Northern Canadian Oils Ltd. Wabamun-Hinton Pipeline | 136.4 | 10¾ OD | In operation | Wabamun, Alt. | Hinton, Alt. |
| Northwestern Utilities, Ltd. | 1,830 | ¾ to 20 | In operation | Leduc, Viking, Kingsella, and other fields | Serves central and northern Alberta |
| Peace River Transmission Co. | 17.5 | 4½ | Complete | Pouce Coupe gas field | Dawson Creek, B.C. |
| Saskatchewan Power Corp. | 266 | 10, 12, 14 | Complete | Coleville, Sask. | Prince Albert, Sask. |
| South Alberta Pipe Lines Ltd. | 54.5 | 10¾, 6⅝, 4½ | Commenced operation Sept. '56 | Etzikom, Alt. | Medicine Hat, Alt. |
| Trans-Canada Pipe Lines Ltd. | 2,280 | 20 to 34 | Scheduled completion fall of '58 | Alberta-Saskatchewan border near Burstall, Sask. | Montreal |
| Westcoast Transmission Co. Ltd. | 650 | 30 | Scheduled completion Nov. '57 | Taylor Flats, B.C. | Huntingdon, B.C. |



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**CANADA—PRODUCTION VS. PRODUCTIBILITY AND RESERVES**

| | Production Bbls./D | Producibility Bbls./D | Prod. as % of Producibility | Year End Remaining Reserves MM Bbls. |
|---|---|---|---|---|
| 1955 | 352,000 | 655,000 | 54 | 3,000 |
| 1960 | 605,000 | 1,380,000 | 44 | 6,600 |
| 1980—Case A | 2,000,000 | 2,800,000 | 71 | 13,300 |
| Case B | 3,000,000 | 3,800,000 | 79 | 17,400 |

Source: Imperial Oil Ltd.

**CANADA—PRINCIPAL CRUDE PIPELINES**

| | Length (miles) | Capacity (thousand barrels per day) |
|---|---|---|
| Trans Mountain | 787 | 240 |
| Interprovincial | 1,930 | 235 (ex Edmonton) |
| | | 211 (into Sarnia) |
| | | 111 (into Port Credit) |
| Montreal-Portland | 236 | 252 |
| Trans-Northern (products) | 441 | 64 |
| Sarnia Products (I.O.L.) | 195 | 76 |
| Sun Canadian (products, Sarnia-Toronto) | 211 | 25 |

*Imports and Exports*: During 1957, exports were unusually high, due to the Suez crisis. Exports of crude oil were 115,000 b/d during 1956, and averaged about 200,000 b/d during 1957. Value of these exports is estimated at $103 million (Canadian) in 1956.

A recent study of the West Coast petroleum industry by The Chase Manhattan Bank (made before recent limitations were imposed) estimates that Canadian shipments of crude oil into the West Coast area will increase from 67,000 b/d in 1956 to 420,000 b/d by 1966; while natural-gas deliveries will climb to 1.5 billion cubic feet daily by 1966—a fivefold increase.

Exports from western Canada eastward via the Interprovincial pipeline during the first half of 1957 were about the same as during 1956—some 9,200,000 bbl total. These supplies go to United States refineries in Minnesota, Wisconsin, and Michigan. However, the suppliers of these exports were almost reversed. In 1956 Alberta had two-thirds of the market, but in 1957 Saskatchewan had two-thirds, and absorbed an even larger proportion in the latter half of the year.

Crude exports are estimated to expand from present levels to about 175,000 b/d in 1960. If Canadian crude flows to existing markets in western Canada, Quebec, and in the United States, exports in 1980 are expected to be in the neighborhood of 1,610,000 b/d. If domestic Canadian crude supplies these markets and, in addition, supplies a large portion of the USA deficiency on the order of one million b/d, exports in 1980 will be around three million b/d. The recent imposition of import quotas by the USA on West Coast imports may slow this down, however.

In spite of Canada's high production levels, there are considerable imports of both crude and products. During 1957, these imports increased slightly, and at the end of the year receipts of crude from foreign sources were 40% of Canada's consumption of crude. Crude imports are estimated at around 260,000 b/d in 1962, and 110,000 b/d in 1980. All these crude imports are on the east coast of Canada, which at present is not supplied by western Canadian sources. Product imports are estimated to increase to 125,000 b/d in 1960, and to 253,000 b/d in 1980.

*Financial Requirements:* Estimated capital investment in oil during 1946-56 is estimated at a total of $3,886 million. Of this amount, direct investment of new capital by the USA oil industry was $1,309 million, or 33.7% of the total capital invested. Investment required during the coming quarter-century has been estimated at between 14 and 18 billion dollars. This covers only exploration and development phases. For other phases, about three to four billions will be required, for a total of about 20 billion dollars—or roughly one billion per year.

*Prices*: Prices in Canada are lower than in the United States, due partly to the pipeline tariffs involved in getting oil to markets.

The upward adjustment in the USA crude prices during 1957 brought a corresponding rise in Canadian crude prices. This increase was about 18 cents per barrel.

**CANADA—REFINERY THROUGHPUT**
(Thousands of Barrels Daily)

| | 1955 | 1960 | 1980 |
|---|---|---|---|
| British Columbia | 52 | 60 | 135 |
| Prairie Provinces | 143 | 180 | 350 |
| Ontario/Quebec | 317 | 410 | 905 |
| Atlantic Provinces | 18 | 40 | 110 |
| Canada | 530 | 690 | 1,500 |

Source: Imperial Oil Ltd. estimate.

**CANADA—CONSUMPTION OF CRUDE AND PRODUCTS BY REGIONS**
(Thousands of Barrels Daily)

| | 1955 Volume | 1960 Volume | 1980 Volume |
|---|---|---|---|
| British Columbia | 65 | 80 | 175 |
| Prairie Provinces | 143 | 169 | 350 |
| Ontario/Quebec | 359 | 487 | 1,070 |
| Atlantic Provinces | 56 | 72 | 158 |
| Canada | 623 | 808 | 1,753 |

## OIL LAWS

No basic changes occurred in Alberta's basic legislation governing oil exploration and development during 1957. The principal provisions remain as outlined in *World Petroleum Report 1957*. An act amending "Petroleum & Natural Gas Act, 1954" was passed by the the British Columbia Legislative Assembly. It is known as the Amendment Act of 1957. It enacts several major changes, of which the most significant is the provision enabling an operator to acquire a natural-gas license and subsequently to earn gas leases by carrying out development drilling upon the license.

In Manitoba, a new regulation provides that any seismic shot hole or any structure test hole must be marked with a metal tag giving the operator's license number and the shot point number.

Land royalties were revised in Saskatchewan by Order in Council No. 873/56, effective April 1, 1957. Royalties now run from a minimum of 5% on production up to 600 bbl per month to a maximum 16% on production of

## CANADIAN REFINERIES

*NOTE:* Only changes which have occurred since publication of *World Petroleum Report 1957*, p. 66, are indicated here. All other data remain the same.

| *Name of Company* | *Plant Location* | *Crude Capacity (Barrels Daily)* | *Type Plant* | *Cracking Capacity (Barrels Daily)* |
|---|---|---|---|---|
| British American Oil Co. Ltd. | Montreal, Que.[1] | 45,000 | SCA | 19,250C |
| | Port Moody, B.C. | 20,000[2] | | |
| Canadian Husky Oil Co. Ltd. | Fort William, Ont.[3] | 4,000 | | — |
| Canadian Oil Refineries Ltd. | Sarnia, Ont.[4] | 30,000 | SC | 13,000C |
| Cities Service | Toronto W., Ont. | 20,000[5] | | |
| Consumers Co-op Ref. | Regina, Sask. | 16,000 | SCA | 8,000TC |
| Excelsior Refineries Ltd | Lloydminster, Alta. | 3,500 | SA | — |
| | Las Pas, Man. | 2,000[6] | | — |
| Imperial Oil Limited | Montreal, Que.[7] | 65,000 | SCA | 29,500TC |
| | Halifax, N.S.[8] | 42,000 | Comp. | 38,700TC |
| | Winnipeg, Man.[9] | 15,000 | SCA | 6,400C |
| | Edmonton, Alta.[10] | 25,000 | Comp. | 22,900TC |
| | Vancouver, B.C.[11] | 25,000 | SCA | 11,800C |
| Irving Oil Co. | St. John, N.B. | 42,000[12] | | |
| McColl Frontenac Oil Co. | Montreal E., Que.[13] | 55,000 | SC | 32,500TC |
| | Edmonton, Alta.[14] | 11,500 | SC | 5,800TC |
| North Star Oil Co. Ltd. | St. Boniface, Man.[15] | | | |
| Royalite Products Ltd. | Kamloops, B.C.[16] | 5,000 | SA | 1,400 |
| Royalite-Hiway Ltd. (Royalite Oil Co.) | Saskatoon, Sask. | 6,500 | SCA | 7,660TC |
| Shell Oil Co. of Canada Ltd. | Montreal E., Que.[17] | 60,000 | Comp. | 28,500TC |
| United Farmers of Alberta Ltd. | Calgary, Alta.[18] | | | |

[1] 16,000 b/d catalytic cracking and 13,000 b/d catalytic reforming; a 15,500 b/d catalytic desulfurization unit. [2] Now building for 1958 completion. [3] 1,000 b/d dieselformer planned. [4] 4,500 b/d Platforming; catalytic cracking to 13,000 b/d. 20,000 b/d distillate unit planned for 1959 completion. [5] Began construction 1957 for 1959 completion. [6] 2,000 b/d crude capacity planned for Las Pas, first in northern Manitoba. Date completion not known. [7] 12,000 b/d thermal cracking, 17,500 b/d catalytic cracking, 12,200 b/d catalytic reforming. [8] 27,800 b/d fluid catalytic cracking, 6,300 b/d catalytic reforming. [9] 15,000 b/d catalytic cracking, 5,000 b/d thermal cracking. [10] 9,100 b/d thermal cracking, 12,800 b/d catalytic cracking, 2,000 b/d Powerforming. [11] Building 5,800 b/d Powerforming. [12] Construction announced late in 1957; completion not known. [13] 12,500 b/d thermal cracking, 20,000 b/d catalytic cracking, 11,000 b/d catalytic reforming, 10,000 b/d hydrotreating under construction. [14] 3,100 b/d thermal cracking, 2,700 b/d catalytic cracking, 3,000 b/d Platformer. [15] 12,000 b/d reforming unit to be installed; date not known. [16] 3,500 b/d Platforming and Unifining. [17] 9,000 b/d catalytic cracking, 2,750 Platforming. [18] Refinery planned—size, type, and date not known.

Capacities are in barrels per day. Key to type of plant: S—Skimming; L—Lubricating; A—Asphalt; C—Cracking; Comp.—Complete. Under "cracking capacity" to indicate type: T—Thermal; C—Catalytic.

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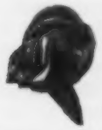

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4,950 bbl per month and over. For natural gas, the royalty was set at a minimum of ½ of 1 cent per 1,000 cu. ft.

A bill was proposed during 1957 to the federal legislature at Ottawa for granting of mineral and oil rights over territorial waters of Canada. These territorial waters are those over which the federal government knows it has complete jurisdiction—which would mean lands in the Northwest Territories, or the Yukon Territory, or any other lands which are not located in the provinces.

New regulations were promulgated by the federal government for the Northwest Territories. They are known as The Northwest Territorial Oil and Gas Regulations. These regulations have the effect only of modernizing existing legislation in the area, without substantial change.

**Conservation:** Conservation is highly developed in Canada, in the two largest producing provinces of Alberta and Saskatchewan. A new conservation act adopted in British Columbia during 1957 permits a conservation board, but there is no indication such a board will be formed in the immediate future.

An important change was made in Alberta conservation regulations during 1957. A new act was passed, early in the year, which draws on the experience of American and other conservation efforts.

The objectives of the new Alberta conservation act are about the same as those of the 1950 act. The same regulations will probably apply. Objectives are: (a) to conserve oil and gas; (b) to prevent waste of oil and gas; (c) to secure observance of safe practices in operations; and (d) to afford each owner his just share in production of any pool.

A conservation board of three members—which is a separate body free of political influence—is set up. This board governs all conservation activities—including prorationing, well spacing, drilling, completion, and abandonment.

The board enforced compulsory unitization of the Pembina field during 1957. Its decision was promptly appealed by Phillips Petroleum Co., and the measure was deferred. The board also ordered compulsory gas-conservation measures to be put into effect at Pembina, effective November 1.

*Saskatchewan:* Outside Saskatchewan and Alberta, and the new act in British Columbia, drilling and production and other conservation practices are generally accomplished by regulations under the appropriate mines and minerals act, or similar legislation. In Saskatchewan, however, the conservation act gives control over prevention of waste, engineering, unitization, pooling, drilling, producing, etc., very similar to that of Alberta. It is based, as is Alberta's statute, on American precedents. The major difference is that controls are retained in the departments of mineral resources, and not in a conservation board as such. This means closer political control over oil and gas developments in Saskatchewan; however, so far industry relations have been good.

*Recent Conservation Developments*: The Conservation Board of Alberta recently overhauled its Economic Allowance System to put greater emphasis on costs and depths of wells and their maximum permissible rates of production. A "two-stage" economic allowance system has begun, effective January 1, 1958.

**CANADA—ESTIMATED CONSUMPTION OF ENERGY**

(Trillions of Btu's)

| | 1955 Volume | 1980 Volume | 1980 vs 1955 % Change |
|---|---|---|---|
| Petroleum | 1,330 | 3,743 | +181 |
| Coal | 898 | 859 | — 4 |
| Natural Gas | 138 | 845 | +512 |
| Water Power | 227 | 485 | +114 |
| Fuel Wood | 204 | 134 | — 34 |
| Nuclear Energy | — | 18 | + |
| Total | 2,797 | 6,084 | +118 |

Source: Imperial Oil Ltd.

**CANADA—OIL TRADE AND VALUES**

| | Crude imports | | Domestic crude production | | Crude exports | |
|---|---|---|---|---|---|---|
| Year | Barrels per day | Millions of dollars per year | Barrels per day | Millions of dollars per year | Barrels per day | Millions of dollars per year |
| 1946 | 173,718 | 89.4 | 19,438 | 14.7 | — | — |
| 1955 | 237,405 | 229.5 | 354,633 | 310.7 | 45,900 | 36.3 |
| 1956 | 291,889 | 270.9 | 469,892 | 421.5 | 115,274 | 103.0 |

**CANADA—PETROLEUM DEMAND**

(Thousands of Barrels Daily)

| | 1955 Volume | 1955 % | 1960 Volume | 1980 Volume | 1980 vs 1955 % Change |
|---|---|---|---|---|---|
| Aviation Fuels | 16 | 2.6 | 20 | 46 | +188 |
| Motor Gasoline | 214 | 34.3 | 278 | 544 | +154 |
| Middle Distillate | 186 | 29.9 | 263 | 494 | +166 |
| Heavy Fuel Oil | 118 | 18.9 | 130 | 374 | +217 |
| Other Products | 89 | 14.3 | 117 | 295 | +231 |
| Crude and Product Demand | 623 | 100.0 | 808 | 1,753 | +181 |

Source: Imperial Oil Ltd.

**CANADA—PRODUCT PRICES 1957 IN OTTAWA**

(As of Sept. 20)

| Exchange Rate | Gasoline Grade | Gasoline Retail Price | Gasoline Includes Taxes | Kerosine Grade | Kerosine Retail Price | Motor Lubricating Oils Grade | Motor Lubricating Oils Retail | Motor Lubricating Oils Includes Duty | Motor Lubricating Oils Includes Taxes |
|---|---|---|---|---|---|---|---|---|---|
| Dollar | | | | | | | | | |
| — | Reg. | 38.4 | 11.3 | Stan. | 33.3 | Stan. | | | |
| $1.05 | | | 10% | | | 1 | 261.7 | 12.5% | 10% |
| | Prem. | 41.0 | 11.3 | | | 2 | 209.4 | ad | |
| | | | 10% | | | 3 | 191.9 | valorem | |
| | Avia.[2] | | | | | | | | |
| | 80/87 octane | 48.0 | | | | | | | |
| | 91/98 | 48.9 | 11.3 | | | | | | |
| | | | 10% | | | | | | |
| | 100/130 | 50.6 | | | | | | | |
| | 115/145 | 52.3 | | | | | | | |

[1]Taxes and duties as shown are included in the retail prices, namely:
Federal Sales Tax—10%.
Ontario Provincial Tax—11.3¢.
Import duty—12.5%.
[2]Prices include a one cent "air fee" in addition to the other taxes shown.

Source: U. S. Bureau of Mines.

## NATIONAL FACTORS

The most important development during 1957 regarding Canada's general favorability for investment was the unexpected victory of the Conservative Party early in the year. The policy of the new conservative government has not yet been fully defined as regards oil; however, in general, it can be considered more nationalistic and more ready to listen to appeals from Canadian industry for protection from American competition, or for more favorable treatment to enable them to compete with American companies. This was heightened by the limitation imposed on imports into the USA West Coast which aroused considerable criticism by Canadians of American policy.

During mid-June, a report by the Tariff Board of Canada recommended tariff protection against imports of casing and tubing, which now enter the country duty-free for use in oil and gas operations.

The new conservative government appointed a royal commission, under the chairmanship of Henry Borden, which could have considerable impact on the future of Canada's oil industry. The commission is to frame policies on energy exports, and on regulation of tariffs, prices, financial structure of oil and natural-gas pipelines. It also is to recommend powers for a new national energy authority. The recommendations of the commission, however, will have considerable effect on Canada's oil future, and will undoubtedly touch upon the subject of USA participation in Canadian development.

The question of USA participation in Canada's oil industry—which was dealt with extensively in the Gordon commission's report—has become a source of controversy recently. Canadians would like to see more participation by Canadian individuals and companies in companies which are foreign-owned. The commission favored a positive approach. Rather than to limit American participation, it was proposed to give certain advantages to companies which have satisfactory Canadian participation.

In general, favorable factors which had made Canadian oil attractive to foreign investment in the past continued to apply. These include a large-area sedimentary terrain, proximity to USA markets, stable government, favorable attitude toward foreign private capital, lack of exchange control, and similar considerations. Difficulties may arise in the future, however, especially under the new conservative government. The recent imposition of a US import limitation may lead to the imposition of a Canadian tariff which will permit western Canada to market its oil in eastern Canada behind tariff protection from imports. Canadian crude prices are lower. This is offset by greater productivity; but in the event Canadian crude is marketed on the East Coast without tariff protection, undoubtedly some further decline in this price structure will be in order. END

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# MEXICO

## PHYSICAL DEVELOPMENT

**Exploration:** Activities during 1957 continued primarily along the coastal plain of the Gulf of Mexico where all of the petroleum producing provinces of Mexico are located. Exploration in this area included an offshore seismic survey between Cabo Rojo and Tecolutla in the state of Veracruz. Objective was the continuation offshore of geological conditions of the famous Golden Lane fields. An offshore wildcat well is slated to be drilled during 1958.

Working under contract with Pemex, Sharmex SA, which is a subsidiary of Sharples Oil Co., of Denver, hit oil-saturated limestone in two of its Tamiahua Lagoon wells. However, they were abandoned at 3,121 ft. and 2,395 ft. after salt water had been encountered. These wells apparently convinced Sharmex that the Golden Lane area did not extend offshore.

Forty-six parties were active in 1957, of which 10 did surface geological work; 14 geological crews were engaged in subsurface investigations; 17 parties continued land seismic surveys; one marine seismic crew was used for 3 months; and 5 gravity-meter parties continued their reconnaissance work in different parts of the country.

In Baja California, one gravity crew completed a reconnaissance survey, and two seismic crews continued studying the subsurface structure of the sedimentray basins along the Pacific Coast of the southern half of the peninsula. A sixth deep test was drilled, and a seventh wildcat is being drilled in the Iray-Purísima basin. No discovery had been made as of December 1, 1957.

Gravity and seismic exploration has been used to complement the geological studies in the states of Nuevo León and eastern Coahuila along the Cretaceous producing belt of northeastern Mexico.

In this area, one gas-producing field was discovered during 1957 in the Garza anticline, 20 miles northwest of Ciudad Anáhuac, N. L. Production was obtained from fractured limestones of the Eagle Ford Upper Cretaceous formation at a shallow depth, and this discovery has definitely proved the production capacity of the Cretaceous calcareous formations of northern Mexico.

A regional gravity survey was initiated in northern Mexico, in the state of Chihuahua, and exploration of this same type was continued in Quintana Roo, covering the eastern part of the peninsula of Yucatán.

In the Tampico and Poza Rica districts, much of the exploration and wildcat drilling had as an objective the testing of Jurassic formations which were found commercially productive for the first time in Mexico in the fields of Constituciones and Tamaulipas, discovered during 1956 and located 15 miles northwest of Tampico.

Also, during 1956, an important and major field was found in San Andrés, 20 miles southeast of Poza Rica. Production in this field, now over 40,000 b/d with 31 wells completed, comes from oölitic and clastic limestones of probable Lower Cretaceous-Upper Jurassic age at an average depth of 10,500 ft. This discovery has opened a new extensive area which lies between the Poza Rica district and the igneous and volcanic Teziutlán massif. In this area, two discoveries were made during 1957, southeast of the San Andres field. These are the Malpica and Gran Morelos fields, now being developed and produced from the same type and age limestone as the San Andrés wells. The Gran Morelos discovery well came in with an initial daily production of 4,500 b/d through a 10-mm choke.

The most important development in the Isthmus of Tehuantepec, where production is related to salt-dome-type structures, was the discovery of the Rodolfo Ogarrio field, located 32 miles east of Coatzacoalcos. Several oil-saturated Miocene sands were encountered in the first wells and, judging by seismic and subsurface information, the field is believed to be of major importance in this area. Other discoveries in the isthmus were made from separated faulted blocks and flank production in the known salt core structures.

New field wildcats drilled during the first 10 months of 1957 were 57, and the fields discovered during this period were 10. Grouped by districts, the new fields discovered in Mexico during 1957 were:

| | |
|---|---|
| Northeastern Mexico: | Garza<br>Torrecillas (gas) |
| Northern Zone: | (Tampico, Golden Land, and Poza Rica districts)<br>Tihuatlan (oil)<br>Malpica (oil)<br>Gran Morelos (oil)<br>Independencia (oil)<br>Caristay (oil) |
| Veracruz Zone: | Nopaltepec (gas) |
| South Zone: | Rodolfo Ogarrio (oil)<br>Mataverde (gas) |

**Production:** Production of crude oil in Mexico has shown a gradual increase, which has been slowing down in recent years. During the first half of 1957, crude output dropped by about 3%, to 249,315 b/d. This was compensated for to some degree by an expected increase in production of natural gas. The total production of both oil and gas-equivalent production is expected to rise to over 400,000 b/d when the new Reynosa to Texas Eastern Transmission Co. pipeline makes its full effect felt.

On August 22, gas from the Brazil, Travino, and Limitas fields of northeastern Mexico began flowing through a new 48-cm gas line by Texas Eastern Transmission Corp. which can handle 115,000 mcf daily. The price of Pemex

**MEXICO—OIL AND GAS PRODUCTION**

| | Oil, Condensate & Absorption Liquids (Barrels) | Gas[1] (Thousands of Cubic Feet) |
|---|---|---|
| 1957 | 68,038,105 (as of Sept.) | 109,139,153 (as of Sept.) |
| 1956 | 94,096,355 | 124,776,880 |
| 1955 | 91,370,125 | 119,771,106 |
| 1954 | 85,230,204 | 93,903,807 |

[1] Petróleos Mexicanos gas production only.

**MEXICO—GEOLOGICAL & GEOPHYSICAL EXPLORATION (Party-Months)**

| | 1957 | 1956 | 1955 |
|---|---|---|---|
| Surface geology | 120 | 115 | 131 |
| Seismograph | 204 | 199 | 194 |
| Gravity | 60 | 60 | 56 |
| Subsurface | 144 | 127 | 129 |

**Source:** Pemex and AAPG.

**MEXICO—WELL DATA**

| | 1957 | 1956 | 1955 | 1947 |
|---|---|---|---|---|
| Exploratory wells drilled: | 86 | 93 | 80 | 16 |
| Oil producers | 13 | 21 | 15 | 2 |
| Gas producers | 9 | 14 | 5 | 2 |
| Dry | 64 | 58 | 60 | 12 |
| Development wells drilled: (as of October 31, 1957) | 237 | 309 | 250 | 35 |
| Oil producers | 153 | 194 | 167 | 24 |
| Gas producers | 48 | 37 | 37 | — |
| Dry | 36 | 78 | 46 | 11 |
| Total wells drilled | 323 | 402 | | |
| Total wells completed | | | 330[1] | 51 (28 productive) |
| Footage drilled: | 2,043,071 | 2,173,918 | 1,790,278 | 296,219 |
| Exploratory | 574,321 | 554,165 | 446,977 | 87,680 |
| Development | 1,468,750 | 1,619,753 | 1,343,301 | 208,539 |
| Total expl. and develop. | 2,043,071 | 2,173,918 | 1,790,278 | 296,219 |
| Drilling rigs in service: | 120 | 110 | 88 | — |
| Total wells drilled (cumulative)—(From 1938 to Oct. 31, 1957) | 26,338 | | | |
| Total oil producers end of year | 1,921 | 2,060 | | |
| Total gas producers end of year | 69 | 47 | | |
| Total wells pumping end of year | 608 | 554 | | |
| Total wells flowing end of year | 1,313 | 1,169 | | |
| Total dry wells end of year (shut-in) | 798 | 847[2] | | |

[1] 182 oil; 42 gas; 106 dry.
[2] Dry wells not given; 847 were shut in.
**Note:** Drilling cost per foot: $205.00, Mex. Cy. dollars 16.40. Drilling cost per well: $1,112,813.00, Mex. Cy. dollars 89,025.40.

# ON THE JOB *Everywhere*

## COOPER

. . . Oil Well Servicing and Workover Units are working in most oil producing areas throughout the world. There is a right size to handle any depth well and the proper model for any field operating condition.

SKID units with their own engine suitable for barge operations or for mounting on trucks or trailers for land operation.

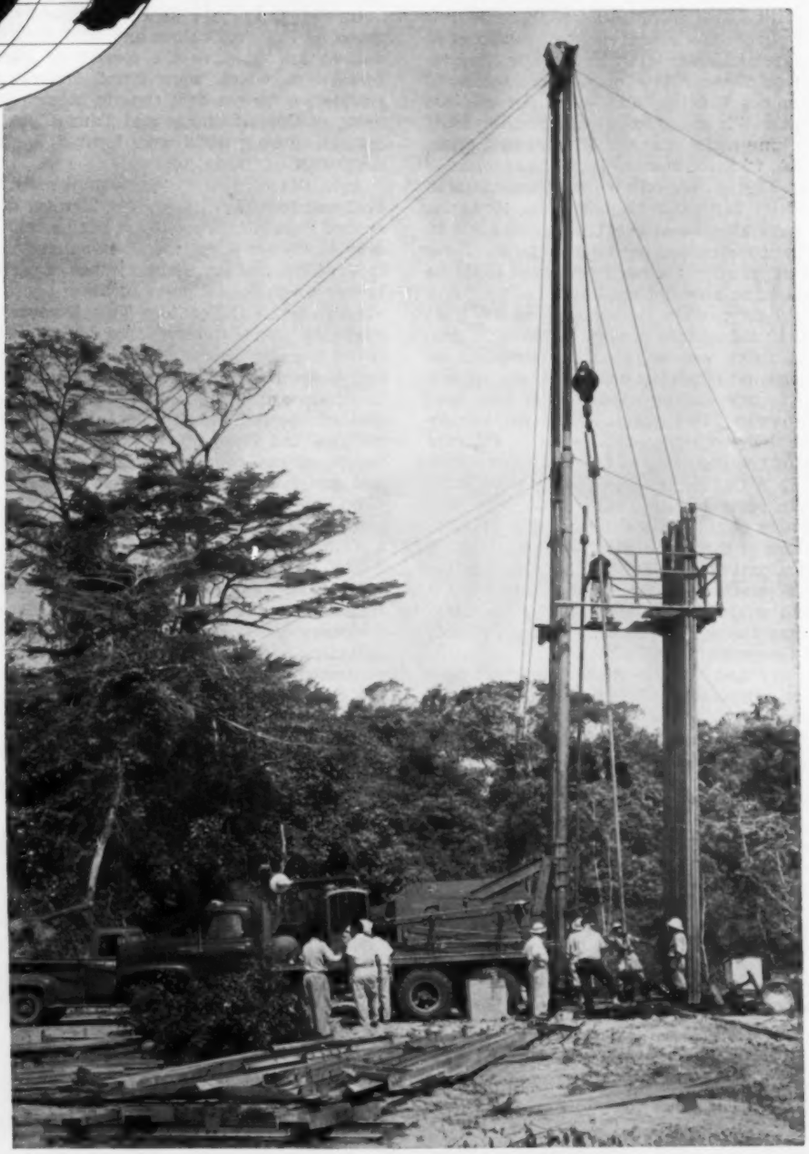
TRUCK mounted units that are powered by the truck motor.

SELF PROPELLED units for the deepest servicing or rotary workover utilizing only one engine to drive the unit over the road and to drive the winch at the well.

TRACTOR mounted units for use where terrain is exceptionally muddy or rough.

SPECIAL units where exceptionally high line pulls are required as in pulling pipe line river crossings.

All COOPER rigs are built in single drum or double drum models and can be powered by gas, gasoline or diesel motors.



Cooper Rig on the job in Southern Old Mexico

*Send us information on the job you want to do and we will gladly recommend the unit that will do it faster, more economically and safer.*

ORIGINATOR OF MOBILE WINCH UNITS

**FRED E. Cooper, Inc.**

**P. O. BOX 1890 TULSA, OKLA.**

**Branches: Houston, Odessa, Los Angeles, Olney**

**MEXICO—PRODUCING WELLS BY TYPE**
(As of Oct. 1, 1957)

| | Flowing | Gas-Lift | Pumping | Total |
|---|---|---|---|---|
| **NORTHEASTERN DISTRICT** | | | | |
| Reynosa | 3 | — | — | 3 |
| Cano | 7 | — | — | 7 |
| Monterrey | 1 | — | — | 1 |
| Treviño | 33 | 14 | — | 47 |
| 18 De Marzo | 1 | — | — | 1 |
| **NORTHERN DISTRICT** | | | | |
| Ebano-Pánuco | 465 | 6 | 80 | 551 |
| Tamaulipas | 22 | — | 3 | 25 |
| Constituciones | 5 | — | 1 | 6 |
| **SOUTHERN DISTRICT** | | | | |
| Faja de Oro | 235 | — | 2 | 237 |
| Moralillo | 20 | — | — | 20 |
| Solis | 27 | — | — | 27 |
| Other Fields | 3 | — | — | 3 |
| **POZA RICA** | | | | |
| Poza Rica (Poza Rica, Metapec, Petronac, Escolin, Alemán, Tajín, Coatzintla, Talaxca) | 149 | 91 | 2 | 242 |
| Nuevo Progreso | 7 | 4 | — | 11 |
| Gutiérrez Zamora | 2 | — | — | 2 |
| Guerrero | 1 | — | — | 1 |
| Hidalgo | 7 | — | — | 7 |
| Tecolutla | 1 | — | — | 1 |
| San Andrés | 26 | — | — | 26 |
| Macarena | 1 | — | — | 1 |
| El Hallazgo | 1 | — | — | 1 |
| Gran Morelos | 1 | — | — | 1 |
| Avila Camacho | 2 | — | — | 2 |
| **NUEVA FAJA DE ORO** | | | | |
| Acuatempa | 20 | — | — | 20 |
| Mozutla | 5 | — | — | 5 |
| Santa Agueda | 52 | — | — | 52 |
| Ordoñez | 18 | — | — | 18 |
| Horcón | 4 | — | — | 4 |
| Xacotla | 1 | — | — | 1 |
| Ocotepec | 5 | — | — | 5 |
| Chichimantla | 1 | — | — | 1 |
| Mesa Cerrada | 2 | — | — | 2 |
| Nueva Colonia | 1 | — | — | 1 |
| Tihuatlán | 2 | — | — | 2 |
| **DISTRICT OF VERACRUZ** | | | | |
| Angostura | 10 | — | 7 | 17 |
| Casa Blanca | 1 | — | — | 1 |
| Tres Higueras | 4 | — | — | 4 |
| **ISTHMUS OF TEHUANTEPEC** | | | | |
| El Plan | 36 | 36 | 62 | 134 |
| Tonalá | 6 | — | 71 | 77 |
| El Burro | 9 | — | 45 | 54 |
| Cuichapa | 2 | — | 11 | 13 |
| Acalapa | 1 | — | 4 | 5 |
| Moloacan | — | — | 12 | 12 |
| Filisola | — | — | 36 | 36 |
| Arroyo Blanco | 3 | 1 | 16 | 20 |
| Tacuilolapa | 4 | — | 3 | 7 |
| Agata | 6 | — | 1 | 7 |
| Rabón Grande | 2 | 5 | 10 | 17 |
| Ixhuatlán | 2 | — | 56 | 58 |
| Nuevo Teapa | — | — | 17 | 17 |
| **TABASCO** | | | | |
| Fortuna Nacional | 2 | — | — | 2 |
| José Colomo | 5 | 11 | — | 16 |
| Vernet | 9 | 1 | — | 10 |
| La Venta | 73 | — | — | 73 |
| Ogarrio | 7 | — | — | 7 |
| TOTAL | 1,313 | 169 | 439 | 1,921 |

is 14.5 US cents per mcf on these initial shipments, which would provide an income of about 75 million pesos daily.

**Transportation:** Mexico, as of September 1957, had a total of 4,000 miles of oil and gas pipelines, of which 1,229 miles have been built in the past four years in an effort to overcome the country's chronic transportation shortage. Pemex has to date accounted for 17% of the existing oil pipelines, 16% of existing gas pipelines, and 74% of the nation's product lines.

Plans were announced for construction of a $16 million 18-in. gas pipeline to Mexico City from the gas reserves in Tabasco, southeastern Mexico. Negotiations are still under way for the construction of this line, which will be an 18-in. connection from the Jose Colomo field to the Minatitlan refinery in Veracruz. From there to Mexico City, the line will be 24-in. It will provide the first major outlet for Pemex southeastern gas fields, and is one of the largest of the Pemex projects.

Pemex has under construction several new pipelines. They include: (1) an oil line from Tamaulipas fields to Tampico; (2) oil and gas pipeline from Xacotla to Alamo, plus expansion of the gas-collection system in Poza Rica area; (3) a gas-collection system at Reynosa district; (4) a gas line from Reynosa to Monterrey.

**Refining:** Pemex's efforts have been devoted in recent years to increasing cracking capacity. Projects under way at present include: (1) a gas-absorption plant at Ciudad Pemex; (2) addition of catalytic cracking capacity at Atzcopotzalco; (3) modernization of the Ciudad Madero refinery; (4) a lube-oil plant at Minatitlan refinery; (5) a grease plant at Salamanca refinery; (6) modernization and increased capacity at Poza Rica refinery.

Petrochemicals expanded during 1957. Montrose Mexicana SA, associated with the Montrose Chemical Corp., of California, began construction on a new $4 million chemical plant in Salamanca, in Guanjuato state. Corbu Industrial de Mexico began construction on a $1½ million chemical plant in Hidalgo, Michoacán state. A plant to produce drugs and cosmetics was built at a cost of $750,000 by Swiss, French, and Mexican capital in Mexico City.

The Dow Chemical Co. bought half of a local firm, Productos Quimicos Mexicanos SA, to produce caustic soda. Plans call for doubling the plant's output. Another firm, Industrial Aldos SA, put a new acid plant into production last June.

Pemex is making a major investment of $27 million in development of the Jose Colomo field and its installations, especially the 300-million-cubic-feet-daily gas-absorption plant which is located about 5 miles from the field.

**Marketing:** The sharp rise in domestic con-

**MEXICO—TANKER FLEET TRANSPORTATION**
(17 Tankers)

| | 1954 | 1955 | 1956 |
|---|---|---|---|
| Volume transported (in barrels) | 36,568,527 | 44,105,553 | 43,372,729 |

**REFINERIES IN MEXICO—1957**

| *Name of Company* | *Plant Location* | *Crude Capacity* | *Type Plant* | *Cracking Capacity* |
|---|---|---|---|---|
| Petroleos Mexicanos | Arbol Grande, Tampico | 40,000 | SAL | — |
| | Atzcapotzalco, D.F.[1] | 100,000 | SC | 18,000T |
| | Ciudad Madero, Tampico [2] | 89,000 | SA | 8,500VB |
| | Mata Redonda, Veracruz | 14,000 | S | 9,500VB |
| | Minatitlán, Veracruz [3] | 50,000 | SC | 10,000C |
| | Poza Rica, Veracruz [4] | 7,000 | S | — |
| | Reynosa, Tampico [5] | 10,000 | S | 2,000T |
| | Salamanca, Guanajuato | 40,000 | Comp. | 5,300T |
| | Total | 350,000 | | 53,300 |
| | Cd. Pemex, Tabasco [6] | | | |

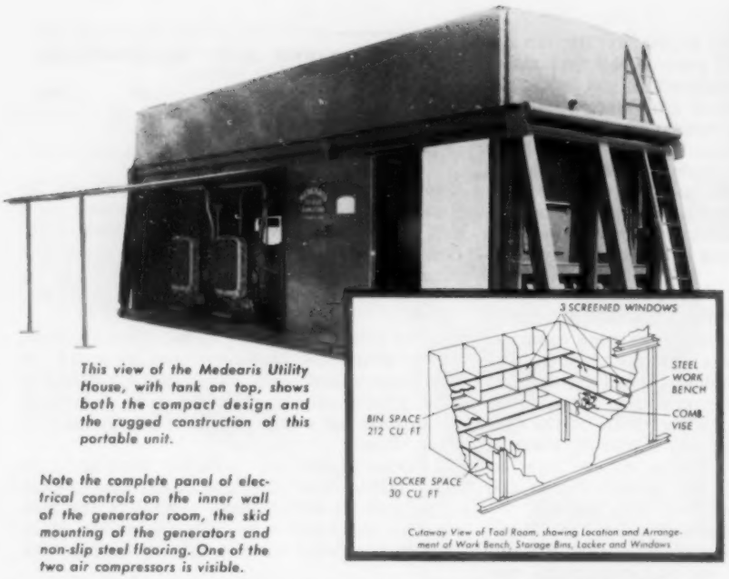
[1] 50,000 b/d vacuum unit, 26,000 b/d cat. cracker, 3,000 b/d alkylation unit and 800 b/d cat. poly. unit under construction.
[2] 12,000 b/d cat. reforming capacity. Crude capacity to be increased to 102,000 b/d, a vacuum unit cat. cracker, polymerization, and sulfur-recovery plant planned for construction.
[3] Lube plant under construction; complete August 1958.
[4] In connection with 90,000 b/d crude stabilizer, 240 mmcf per day absorption plant, 240 tons per day sulfur-recovery plant.
[5] 300 mmcf per day absorption plant.
[6] 300 mmcf per day absorption plant.

Capacities are in barrels per day. Key to type of plant: S—skimming; L—lubricating; A—asphalt; C—cracking; Comp.—complete. Under cracking capacity to indicate type: T—thermal; C—catalytic; VB—vis-breaking. All data as of December 1, 1957.

**MEXICO—PRODUCTION AND DRILLING DATA**

| Name of Field | Year Discovered | Number of Wells Flowing (First Half 1957) | Number of Wells Pumping (First Half 1957) | Depth (Feet) | Producing Formation | API Gravity | PRODUCTION (Barrels Per Day) 1957 (First Half 1957) | PRODUCTION (Barrels Per Day) 1956 |
|---|---|---|---|---|---|---|---|---|
| Northeastern District | 1945 | 47 | 14 | 7,348 | Oligocene | 46 | 4,111 | 4,626 |
| Tampico North | 1901 | 481 | 70 | 5,538 | El abra, Cretaceous | 17 | 23,261 | 20,372 |
| Tampico South | 1908 | 291 | 3 | 4,319 | El abra, Cretaceous | 18 | 15,824 | 16,222 |
| Nueva Faja de Oro | 1952 | 100 | — | 5,277 | El abra, Cretaceous | 19 | 47,431 | 60,447 |
| Poza Rica | 1930 | 171 | 96 | 8,067 | Tamabra, Cretaceous | 35 | 116,702 | 116,984 |
| Central Veracruz | 1953 | 15 | 2 | 6,383 | Escamela, Cretaceous | 30 | 12,788 | 14,986 |
| Isthmus & Tabasco | 1911 | 151 | 395 | 4,804 | Miocene | 35 | 29,198 | 23,457 |
| | | 1,256 | 580 | | | | | |
| Total B/D | | | | | | | 249,315 | 257,094 |

Total reserves of hydrocarbons as of March 15, 1957 are given as 3,086,000,000 bbl., of which 1,826,000,000 consisted of crude and condensate and 1,260,000,000 of gas-equivalent.
**Note:** President Cortines gives reserves of oil and "gas-equivalent" as of Sept. 1, 1957, as 3.3 billion barrels.

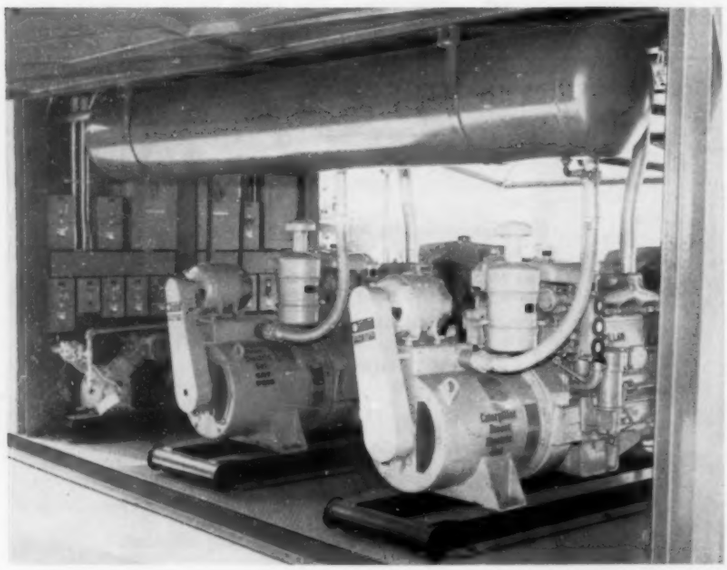


*This view of the Medearis Utility House, with tank on top, shows both the compact design and the rugged construction of this portable unit.*

*Note the complete panel of electrical controls on the inner wall of the generator room, the skid mounting of the generators and non-slip steel flooring. One of the two air compressors is visible.*




*Cutaway View of Tool Room, showing Location and Arrangement of Work Bench, Storage Bins, Locker and Windows*



# MEDEARIS
## Oil Well SUPPLY CORP.

## MEDEARIS UNITIZED UTILITY HOUSE WITH TOP-MOUNTED FUEL TANK

This compact, fully-protected utility house has proven popular with operators in many parts of the oil country because it provides adequate electric power and controls for all the electrical needs of the rig—motors, pumps, lights, etc.—together with excellent storage and work space. Of all-steel, all-welded construction, fully-painted, the Medearis utility house is equipped with safeguards which make it weather-proof, damage-proof and burglar-proof. It meets all highway regulations for width and weight, and is skid-mounted and strongly braced for easiest moving. The fuel tank is also skid-mounted for separate moving.

The generator room, at the left above, houses two generators, two air compressors, and a 300-lb. air receiver tank mounted against the overhead, together with a complete central control panel for all electric requirements. The make and capacity of the generators and air compressors are at the option of the customer. (In the unit shown here, 40KW Caterpillar Diesels were installed on customer's order.) Both sides of the generator room are in two hinged sections, easy to lift into the position shown, where they are supported on the posts supplied to form generous canopies, front or back. When lowered, the sides are held in place by bolts, or may be padlocked for complete security. Electricity is supplied through outside plugs when the generator room is closed. Electric-driven wash-down pumps, or fuel transfer pumps, are often added at customers' option, and may be installed either inside or outside.

The cutaway drawing of the tool room shows the large amount of storage space and the standard spacing of the bins. The size and arrangement of these may be altered to suit customers' needs at time of order. A locker is provided just inside the door. The screened windows are covered with jimmy-proof steel shutters, hinged at the top and equipped with inside controls which will hold them open at any desired angle for light and ventilation. Much favorable comment has been given the inside locking arrangement of the tool house door — fastened by a padlock which can be reached only through the swinging access plate in the door. This feature makes it impossible to force or pry off the lock.

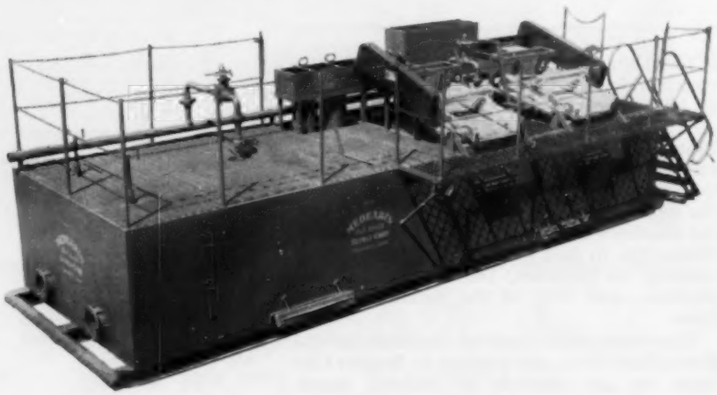
All-steel, all-welded fuel tanks are supplied in 5,000, 6,000, or 8,000 gallon capacities. Due to internal baffling, tanks may be transported when containing up to half their capacity of fuel. Inclined bottoms insure free flow of fuel, particularly since the bottom of the tank is 8 feet 6 inches above the ground when set in place on the utility house. Access hatches for inspection or cleaning are situated on the top of the tank.

## MEDEARIS UNITIZED MUD SUCTION TANK, WITH SHAKERS, MUD DITCH AND CHEMICAL TANK

For many years, a large part of our work has been the design and construction of unitized mud-handling equipment to meet customers' requirements—everything from simple mud ditches to complete mud systems.

The unitized mud suction tank, above, incorporating many improved features, has proved so popular that it may be regarded as a standard unit. The tank is 30' long, 7' 9" wide to meet all highway regulations, and is 5' deep, with a capacity of 180 barrels of mud. Medearis Type X mud shakers are supplied unless the customer specifies otherwise. Sloped-bottom desanders are immediately below each shaker to trap fine floury sand which may pass through the screens. Both the desander dump-gates and the clean-out gates at tank bottom are lever-controlled from the top deck. The mud ditch incorporates bypass valves and a chemical tank. Two Medearis pump suction valves provide positive control, and thorough agitation is given by a built-in Medearis revolving mud gun. The top deck and catwalk are non-slip grating. The posts and chain rail are instantly demountable as are the access stairs, and the hinged catwalk folds in for transportation.

Other types of mud tanks and mud ditches, incorporating mud laboratories, mud storage facilities, pump manifolds, mixing hoppers and other equipment, are available from Medearis, designed and constructed to meet any requirements of the customer.



**MEDEARIS** | **Oil Well SUPPLY CORP.**

*Foreign Licensed Manufacturer: J. W. CUBBAGE & SONS, LTD., High-Wycombe, England*

21000 SO. NORMANDIE AVE. • TORRANCE, CALIF., U. S. A.

sumption of petroleum, which had averaged about 9% yearly since the end of World War II, has continued, and it rose 13.3% during 1957.

Rising domestic consumption is the No. 1 problem of the Mexican oil industry. Of total consumption, approximately 79% is covered by production from Mexican sources. Oil already represents the largest single import in Mexico, and is expected to continue its rapid rise. For Pemex, imports meant outlay of exchange in 1956 of approximately $70 million. It deprived Pemex of the funds needed for its expansion program, especially when coupled with the low level of internal prices.

Mexico exported a total of 23,722,022 bbl of petroleum during 1956, of which 28% was crude oil—down about 2 million barrels from 1955. Exports of crude and fuel oil during the first 5 months of 1957 were down 25.3%. This was counterbalanced somewhat by refinery throughput during the same period—which was up 4.4%. The oil-supply problem is particularly important to Mexico, since 85% of the country's energy needs are supplied by petroleum.

Income by Pemex during 1956 was 3,573,474,000 pesos. This was derived 2,997,274,000 pesos from domestic sales, 563,597,000 pesos from foreign sales, and 12,604,000 pesos from its latest income. Taxes paid during the year to the federal government came to 445,552,500 pesos, and to states and municipalities were 32,214,000. These do not include, as in former years, installments on the petroleum debt, royalties on production, and patrimony interests which Pemex no longer has to cover.

Subsidies granted by Pemex during 1956 amounted to 389,639,500 pesos. Investments in all branches of the industry by Pemex were 901,728,884 pesos, compared with 988,570,108 in 1955. Pemex investment program for 1957 contemplates outlay of about 500 million pesos, which includes completion of two catalytic plants and a lube plant, modernization of two refineries, pipelines, and a gas-absorption plant.

There are 10 private companies which operate in Mexico. They buy base-stock lubricating oil from Pemex, and import additives for blending and sell under their own brand names.

## OIL LAWS

No changes occurred in Mexico's oil laws during 1957. They remain as summarized in *World Petroleum Report 1957*. No new drilling contracts of the type therein described were concluded during the year. Commitments by Pemex for payments under these contracts and obligations arising from the expropriation have been paid promptly.

## NATIONAL FACTORS

The realization that Pemex's resources were not sufficient for development of Mexico's oil industry aroused considerable comment in 1957—none of it of a nature likely to change the present monopoly arrangement. Recently Mr. Eustaquio Escandon, an official of the Confederation of National Chambers of Commerce, called for foreign investment in Mexico's oil industry. He said the country is losing between $50 million and $100 million yearly because the industry is underdeveloped. A similar statement was made by the Banco Nacional de Mexico, the largest private bank in Mexico, which stated that failure to develop the oil industry places the entire industrial development in Mexico in grave danger.

These statements were promptly attacked—first by the Oil Workers Union and next by the followers of former President Lazaro Cardenas. The latter proposed a program which comprised: (1) nationalization of basic industries; (2) basic industries to be forced to serve the "progress" of the country; (3) protection from foreign competition of Mexican industry, including protection from foreign investments inside Mexico, and "legislation to control foreign investment"; (5) nationalization of private lending institutions; (6) limitation of all profits of all enterprises.

## Oil Law Summary★

*Subsoil rights vested in govt. since 1917. Exploration, development, and other oil activities can only be carried out by govt. through public entity, or contracts with private parties or companies where govt. holds majority of stock ownership.*

**RECONNAISSANCE:** May be freely carried on (by Mexicans) without concession. Contracts for exploration given after competitive bidding.

**EXPLORATION:** Max. per concessionaire 75,000 acres. **Duration:** 3 yrs. **Govt. Companies:** Have preference over any area. May hold unlimited number of concessions. **Bond:** Bond of 10% agreed production value must be posted on application.

**EXPLOITATION:** Subject to the same ownership requirements as above. **Duration:** 30 yrs. Granted after competitive bidding. **Area:** 62,500 acres per concession. ⅛ of production area discovered must be given govt. through checker-boarding. **Bond:** Must be posted same as exploration. **Refining, Transportation, Marketing:** Special concessions given, subject to same ownership restrictions. Duration 50 yrs. No specific right of surrender contained. Transfer on govt. approval only. Govt. reserves right to use 20% of capacity at any time. Classified as public utilities at rates periodically set by govt. **Special Contracts:** Special drilling contracts are being concluded with American companies, but are not considered oil rights. **Cities Service Contract:** Provides for exploration of 1,000,000 acres held by company previous to 1938 expropriation. Cities Service finances Pemex up to $10 million, giving technical advice and supplying material. $10 million paid back in 10 yrs. In event of discovery, company has option to purchase up to 50% of production at from 15¢ to 35¢ per barrel below market price, depending upon quantity purchased. **Cima Contract:** Cima makes all necessary investments. In return, receives proceeds from sale of 50% of production from Cima wells. Not subject to taxes. Pemex retains control of supervision of operations. Duration of contract 25 yrs. Cima has option to purchase additional production available after Pemex' domestic needs have been met. **Sharmex Contract:** Drilling carried on for 12 yrs. over 60,000 acres in Reynosa area. All cost paid by Sharmex, no rights of ownership acquired. All control vested in Pemex. If production obtained, wells produced by Pemex. Company repaid exploration and drilling expense from 25% value of sale production or from 50% of same if it agrees to purchase part of production. Company exempt from all taxation. Guaranty bond of $500,000 must be posted. As compensation, company receives 15% of value of sales of production over a 25-year period. If no production obtained, company receives no compensation.

★Taken from *World Petroleum Legislation*, 601 Fifth Ave., N. Y. 20, N. Y. (see p. 37-38)

**MEXICO—REFINING AND MARKETING**

| | DOMESTIC CONSUMPTION | | | FOREIGN TRADE | | | | REFINERY RUNS | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Imports | | Exports | | | Month of August | | |
| | 1957 Jan.-July | 1956 | 1955 | 1957 Jan.-July | 1956 | 1957 Jan.-July | 1956 | 1957 (As of Jan.-Sept.) | 1957 | 1956 | 1955 |
| Crude oil | 2,746,005 | 2,087,042 | 2,407,701 | 1,013,338 | 40,828 | 3,091,703 | 6,616,164 | 63,637,028 | 7,337,031 | 82,060,563 | 80,505,548 |
| Naptha & residues blend | 433,293 | 85,702 | — | 433,293 | 85,702 | — | — | — | — | — | — |
| Fuel oils: | 21,063,657 | 34,668,124 | 31,931,246 | 1,721,052 | 3,236,875 | 7,020,775 | 17,103,711 | 32,104,811 | 3,546,101 | 44,412,841 | — |
| Heavy industrial | — | — | — | — | — | — | — | — | — | — | — |
| Ships' bunkers | — | — | — | — | — | — | — | — | — | — | — |
| Heating oils | — | — | — | — | — | — | — | — | — | — | — |
| Diesel-gas oils | 7,156,443 | 9,727,388 | 8,155,058 | 2,858,638 | 3,937,989 | — | 63 | 5,912,370 | 822,671 | 5,978,489 | — |
| Residues | — | — | — | — | — | — | — | — | — | — | — |
| Kerosine | 6,260,821 | 9,652,847 | 8,492,425 | 1,779,335 | 1,901,105 | — | 694 | 5,811,175 | 600,691 | 7,862,208 | — |
| Gasolines: | 15,295,895 | 24,305,849 | 21,545,969 | 4,084,027 | 6,223,459 | — | — | 14,789,552 | 1,786,547 | 17,906,100 | — |
| Aviation (100 ON +) | — | — | — | — | — | — | — | 305,346 | 38,877 | 383,045 | — |
| Motor, premium (Super-Mex) (90 ON +) | — | — | — | — | — | — | — | — | — | — | — |
| Regular (88 ON +) (Mexolina) | — | — | — | — | — | — | 1,388 | — | — | — | — |
| Aviation turbine (jet) | — | — | — | — | — | — | — | — | — | — | — |
| Lubricating oils & greases | 572,581 | 1,374,111 | 986,412 | 73,669 | 523,450 | — | — | 758,491 | 82,200 | 811,471 | — |
| Asphalt | 1,304,720 | 1,627,529 | 1,248,858 | 183,632 | 120,770 | — | — | 1,277,342 | 144,345 | 1,251,054 | — |
| Paraffins | 252,990 | 439,626 | 389,584 | 100,863 | 106,668 | — | — | 222,848 | 21,393 | 252,217 | — |
| LPGas | 2,569,636 | 3,851,586 | 2,349,685 | 1,338,113 | 2,094,574 | — | — | 1,052,058 | 120,382 | 1,269,337 | — |
| Others | 6,536 | 30,487 | 26,942 | 6,536 | 30,487 | 8 | 4 | 517,262 | 61,791 | 643,614 | — |
| Total barrels | 57,662,577 | 87,850,291 | 77,533,880 | 13,592,496 | 18,301,907 | 10,112,486 | 23,722,024 | 62,751,255 | 7,224,998 | 80,770,376 | 79,404,211 |
| Average b/d | 271,993 | 240,028 | 212,421 | 64,116 | 50,005 | 47,700 | 64,814 | 229,858 | 223,064 | 220,684 | 217,546 |
| Natural gas, mcf | 29,601,222 | 49,588,836 | 46,631,890 | 12,065,032 | 19,628,298 | 3,033,787 | 4,938,648 | 109,124,730 | 14,194,486 | 124,776,880 | 119,771,106 |

## THE "EVGENIA NIARCHOS"

sister vessel to the highly successful *Spyros Niarchos*, is now in service. On an overall length of 757 feet, she carries 47,000 tons deadweight and has a maximum power of 20,000 S.H.P. Her propeller, like that of the *Spyros Niarchos*, is the largest manufactured in Novoston alloy. It is of Heliston design, five-bladed and weighs 30½ tons.

*Photograph by courtesy of the builders, Vickers-Armstrongs (Shipbuilders) Ltd.*

**J.STONE & CO. (CHARLTON) LTD.**

**OCEANIC HOUSE, 1A COCKSPUR ST., LONDON S. W. 1**

# UNITED STATES

## PHYSICAL DEVELOPMENT

The United States oil industry is approaching its 100th anniversary in 1959, and during the century has grown to nearly half the world oil industry. In terms of assets, the petroleum industry far outreaches any other USA manufacturing industry. Among the first hundred largest companies in the United States during 1955, petroleum companies had 31.5% of total assets. The second larger group was motor vehicles, parts, and equipment, which had 13.7% of assets—followed by steel with 12.6%.

Although the United States for many years comprised over half of the world's oil industry and became an accepted basing point for worldwide pricing thereby, in recent years its position has begun to decline. The USA industry is still growing, but losing its place relatively as the oil industry grows faster outside the borders of the United States. This is due in part to the drilling-up of prospects for big oil finds in the United States. It is also due, as later covered, to increased costs which have forced domestic producers to seek oil outside their country. The slowing down in percentage rate of increase had to occur, since the absolute numerical base of consumption and production has grown so large the task of adding percentages becomes progressively greater.

**Exploration:** The major areas of interest continued to be the offshore areas of the USA East Coast and the Four Corners area in the West. Generally, exploration declined sharply during 1957. The total of wells drilled declined by 3,739 in the first eight months, or 9.6% compared with the first eight months of 1956. The decline for all 1957 is estimated at about 9% under 1956; and, if the usual rate of increase is considered, the decline would be in the neighborhood of 15%. The decline began during late 1956, when the last quarter was only about 200 wells over 1955.

The long-range outlook for drilling and exploration remains good. Assuming an average discovery of about 116,000 bbl. per well, drilling needed to fulfill the large increases in consumption forecast will total about 645,000 wells during the next nine years, an average of around 71,670 wells yearly. The estimate for 1965 is 82,300 wells. This huge total is just under half all the wells drilled in the USA to date. An estimate of expenditures calls for capital outlay of about $6.6 billion in 1965 for drilling and production. Total expenditures for the 1957-61 period are estimated at $25.6 billion.[1]

While drilling costs per well—including the total cost of finding and developing crude-oil production, and including exploration, development, and production costs—rose to $3.16 in 1953, from $1.47 in 1944, later estimates indicate the rise in costs was not so sharp as had appeared. Better technology has offset higher costs to a large degree; and, based on the value of oil discovered, drilling costs have only increased about one penny per foot in 1956 over 1940. This is due to the increased price of crude, which has made 1956 discoveries worth $8.4 billion at current prices, compared with $2 billion in 1940. The average cost per dollar of oil added to reserves was 38 cents in 1956 compared with 37 cents in 1940.

Offshore wells during coming years will rise sharply, and a total of about 1,200 wells will be completed in 1970, according to forecasts—with an average depth of 12,400 ft., compared with 9,700 ft. in 1957, and an expected total of 570 wells during 1957.

**Production:** USA production rose sharply during the first months of 1957, to a world record of 7,717,000 b/d in March. The Suez crisis was the principal factor, and USA exports rose in proportion. Following the crisis, USA production declined again—hitting 6,873,000 b/d in August. State production allowables were increased to meet demand during the early part of the year; and, when the emergency demand had ceased, the producers fought hard to keep from cutting back production. The imports controversy flared up again promptly, as covered later. During 1958, production is estimated at 7,195,000 b/d, about the same as the average for 1957. The first quarter will average 7,170,000 b/d; the second 7,100,000 b/d, the third 7,240,000 b/d; and the fourth quarter 7,260,000 b/d. This assumes the import-control program restrict imports of crude into the United States to about 1,000,000 b/d.

Inventory levels for the first quarter of 1958 are estimated at 271 million barrels of crude oil and 480 million barrels of products, for a total of 751 million barrels, by IPAA estimate.

During the coming eight years, to 1965, production is estimated to rise to 9,470,000 b/d. It will tend to level off after that date—with imports supplying the increase in domestic consumption.

The natural-gas industry has continued to grow rapidly. It is now the nation's sixth largest industry, and expenditures for expansion during 1957 alone totaled $2,128,000,000—over half for transmission facilities. The industry plans to spend $8.7 billion through 1960, compared with $5.3 billion spent from 1953 through 1960. Outlay in 1957 was about $1.028 billion for transmission facilities, $560 million for distribution, $380 for production, $106 for general purposes, and $54 million for underground storage.

Marketed production of natural gas during 1956 rose to 10,082 billion cubic feet—7% over the previous year. Average well-head value was 10.8 cents per mcf. Average value at point of consumption was 41.5 cents per mcf. By 1965, total consumption and loss are forecast at 16,320 billion cubic feet. Imports from Canada and Mexico will supply about 550 billion of this demand. USA domestic production will be around 15,770 billion, including waste and loss.

*Reserves:* Reserves of crude petroleum have continued to rise, but are declining relative to production. In 1954 crude reserves represented 13.1 times crude production for that year. The ratio dropped to 12.4 in 1955, and to 11.9 for 1956. It is estimated to have continued to decline in 1957. This declining ratio is the most threatening aspect of the USA oil picture, for production required during the next 10 years will be over 32 billion barrels—more crude than presently known proved reserves, and reserves must more than keep up with production rates if a safety margin is to be maintained. Based on industry estimates, reserves of crude will rise to about 41 billion barrels by 1965. Reserves of crude, as of January 1, 1957 (the latest available reliable estimate) were 30,434,649,000 bbl. of proved reserve.

Natural-gas reserves as of the 1st of 1957 were 238 trillion cubic feet, equivalent to 22 times 1956 production. The ratio is also decreasing; 10 years ago reserves were 32.5 times production, but the decline is not alarming. The supply recoverable from presently

**UNITED STATES—PRODUCTION AND ADDITIONS TO RESERVES**
(Millions of Barrels Per Year)

| | Total Liquids | | |
|---|---|---|---|
| | Production | Added to Reserves | Total Found |
| 1955 | 2,766 | 646 | 3,412 |
| 1956 | 2,906 | 886 | 3,792 |
| | Forecast | | |
| 1957 | 2,960 | 1,170 | 4,130 |
| 1958 | 3,099 | 1,289 | 4,388 |
| 1959 | 3,234 | 1,339 | 4,573 |
| 1960 | 3,375 | 1,410 | 4,785 |
| 1961 | 3,500 | 1,420 | 4,920 |
| 1962 | 3,632 | 1,579 | 5,211 |
| 1963 | 3,760 | 1,698 | 5,458 |
| 1964 | 3,872 | 1,782 | 5,654 |
| 1965 | 3,975 | 1,750 | 5,725 |

**UNITED STATES—DISCOVERIES AND DRILLING**
(Discoveries in Millions of Barrels)

| | Total Wells Drilled | Oil and Gas Found Per Well* |
|---|---|---|
| 1955 | 56,682 | 125,380 |
| 1956 | 58,160 | 136,830 |
| 1957 | 59,000 | 120,000 |
| 1958 | 62,700 | 120,000 |
| 1959 | 66,000 | 118,000 |
| 1960 | 69,200 | 117,000 |
| 1961 | 71,100 | 117,000 |
| 1962 | 75,000 | 116,000 |
| 1963 | 78,400 | 116,000 |
| 1964 | 81,000 | 116,000 |
| 1965 | 82,300 | 116,000 |

*Barrels per well, crude equivalent. Projected for 1957 and following.

[1] Estimate by Chase Manhattan Bank.

proved reserves and from future discoveries in the United States, including offshore production, will exceed 1,200 trillion cubic feet, according to an estimate by the Chase Manhattan Bank.

**Transportation:** As of the end of 1956, there was a total of 51,336 miles of gathering lines for crude and products, and 91,350 miles of trunk lines; 4,459,451,550 bbl. of crude and products were transported, an increase of 10% over the previous year. Deliveries of crude oil by pipelines are estimated to increase to about 8,300,000 b/d by 1965, and deliveries of products by pipeline will about double in the 1956-65 period, to 5,300,000 b/d. This includes natural-gas liquids as well as products from refineries. Expenditures are estimated at $850 million in 1957, $1 billion in 1960, and $1.45 billion in 1965—for a 10-year total of $11.5 billion.

Gas utilities and pipelines spent $3.13 billion in 1957 for new construction and expansion—37% over the 1956 all-time high. Expenditures over a four-year period (to 1960) are forecast at $8.7 billion.

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A survey of operable refining capacity just completed by the American Petroleum Institute shows, as of the end of 1957, the industry had a daily operable capacity of 9,157,700 bbl. This total is exclusive of 70,100 bbl daily which, on September 30, 1957, was shut down in need of major repairs, but includes 358,150 bbl of capacity which, while operable but believed to be in the high-cost marginal group, also was shut down as of that date.

**USA REFINING CAPACITY**

| Refining Districts (Figures in Barrels Daily) | December 31, 1957 | September 30, 1958 |
|---|---|---|
| *I. East Coast | 1,362,000 | 1,360,450 |
| Appalachian No. 1 | 109,450 | 114,450 |
| II. Appalachian No. 2 | 103,500 | 103,500 |
| Ind.-Ill.-Ky. | 1,578,800 | 1,649,800 |
| Minn.-Wisc.-No. and So. Dakota | 117,900 | 121,400 |
| Okla.-Kans.-Mo. | 763,400 | 768,500 |
| III. Inland Texas | 332,750 | 339,750 |
| Texas Gulf | 2,147,000 | 2,171,500 |
| Louisiana Gulf | 778,000 | 778,000 |
| No. La.-Arkansas | 123,250 | 123,250 |
| Rocky Mt.-New Mex. | 26,300 | 26,300 |
| IV. Other Rocky Mt. | 310,600 | 327,550 |
| V. West Coast | 1,404,750 | 1,410,750 |
| TOTAL UNITED STATES | 9,157,700 | 9,295,200 |

*These are the general supply-and-demand areas of the country, and are the same as the wartime PAW districts, or present Office of Oil and Gas districts.

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**Refining:** Sales and profits of USA petroleum refineries both were on the rise during 1957—with sales in the first half of 1957 $13,917,000,000, for a gain of 15%.

Profits after taxes came to $1,370,000,000, for first half of 1956. In the first half of 1957, they were $1,477,000,000, for a gain of 8%.

For all manufacturing, the sales gain was 6%, but profits dropped 1%.

By 1965, crude runs will be about 11,200,000 b/d—with total refining capacity at about 12,450,000 b/d. Natural-gas liquids will be up to 1,420,000 b/d by 1965.

Refining and chemical plants required $857 million investment in 1957—to rise to an estimated $1.025 billion in 1960, and to $1.375 million in 1965.

The emphasis is still on quality; and, despite new innovations in automobiles, will continue to be for some time. The ceiling for compression ratios of cars may rise to 14:1, or perhaps 16:1, and premium-grade octane gasoline may average 102 or 103 by 1965. This will see an increase in catalytic reforming and in catalytic cracking. The question looming is: When will synthetic fuels become part of the everyday refining pattern?

**Marketing:** The increase in domestic demand during 1957 was disappointing at about 2.5%, compared with 3.5% in 1956. 1958 increase will be about the same as 1957. Domestic demand in 1958 will average 9,380,000 b/d—assuming normal business conditions. Export demand will average about 320,000 b/d—a decline of 40.5% from 1957, and reflecting the end of the Suez crisis.

Gasoline demand is estimated to show a 3% increase in 1958. Middle distillates will be 2.4% over 1957.

Jet fuel will increase an estimated 8%. Residual fuel oil will about hold its own. The remaining products of wax, lubes, etc., will increase about 4.1%.

Including exports, total demand during 1958, therefore, will be down by about 0.4%.

The West Coast area is growing rapidly, and expects an increase of around 61.4% in 1965, according to Chase Manhattan Bank figures.

*Imports:* Following termination of the Suez crisis, the threatened cutback in domestic production to former levels, pushed by a lower demand than expected, caused agitation by domestic producers for limitation of imports, and the government instituted a "voluntary" program therefor. The restrictions apply to crude only, but they mark a major change in policy of the government—which until then had been committed to a nonprotectionist policy.

The import limitation began, February 26, 1955, when President Eisenhower approved the findings of the Cabinet Committee on Energy Supplies and Resources Policy that rising imports would threaten domestic production. He requested imports be held to the same ratio to domestic production they had during 1954. This arrangement worked reasonably well until March 1957, when planned imports rose sharply. The Committee To Investigate Crude-Oil Imports found imports would rise to 16% of domestic production, compared with 11.3% in 1954. The committee findings received Presidential approval. The mechanics are simple, and require established importers to reduce imports by 10%—using average of the years 1954 through 1956 as a base. New importers and small companies (importing less than 20,000 b/d) were asked to adhere to the schedules submitted July 1957, except where they would exceed 12,000 b/d over actual 1956 imports—in which case they were asked to import no more than 12,000 b/d over last year's levels. Additional companies seeking to import are to submit plans six months in advance to the Department of the Interior, and will be given an opportunity to participate. This program only covers Districts I through IV, which does not include the West Coast. Imports there have been rising rapidly, and extension of the program thereto has been made. The program appeared to be working reasonably well at the end of 1957.

*Conservation:* Regulation by the individual states of the USA is especially important as regards conservation and prorationing. State conservation applies whether production is from public or private lands. The principal federal statute in this regard is the Connally hot oil act, which forbids interstate shipment of any oil produced in violation of state conservation laws.

The individual states' programs are coordinated by the Interstate Oil Compact Commission, which has no legal authority to enforce compliance, but acts only in an advisory capacity. It advises such commissions as the Railroad Commission of Texas, in the largest producing state.

The function of the railroad commission (and other states' commissions are similar) is defined as administration and enforcement of the state's conservation and proration laws. These are aimed at preventing waste of oil resources, so defined as to include both physical waste, such as production in excess of MER (maximum efficient rate), gas flaring, etc.; and economic waste, which is defined as "production . . . in excess of . . . demand."

In order to prevent waste of oil resources, the commission meets monthly and reviews reports which must be submitted by all persons engaged in the state oil industry's major segments. By considering such factors as purchasers' nominations for crude during the coming month, inventories of petroleum on hand, the imports and exports planned, and

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**ESTIMATED SUPPLY AND DEMAND BALANCE SHEET**
**UNITED STATES—1958**

| DEMAND | Barrels Daily |
|---|---|
| Domestic demand, all oils | 9,380,000 |
| Exports | 320,000 |
| Total domestic demand, all oils | 9,700,000 |
| **SUPPLY** | |
| Crude-oil production (domestic) | 7,215,000 |
| Natural-gas-liquids production (domestic) | 879,000 |
| Imports (all oils) | 1,674,000* |
| Total supply | 9,768,000 |
| Balance | 68,000** |

*Imports of 1,674,000 b/d consist of 1,138,000 b/d crude; the rest products.
**Balance figure consists of stock changes, i.e., increase in stocks.

**ESTIMATES OF USA PRODUCT DEMAND—1958**

| Domestic demand: | Barrels Daily |
|---|---|
| Gasoline | 4,012,000 |
| Kerosine | 320,000 |
| Distillates | 1,825,000 |
| Residual fuel | 1,569,000 |
| All others | 1,654,000 |
| Export demand: | |
| Gasoline | 90,000 |
| Kerosine | 5,000 |
| Distillates | 65,000 |
| Residuals | 70,000 |
| Others | 90,000 |

---

**USA EXPORTS**
(Thousands of Barrels Daily)

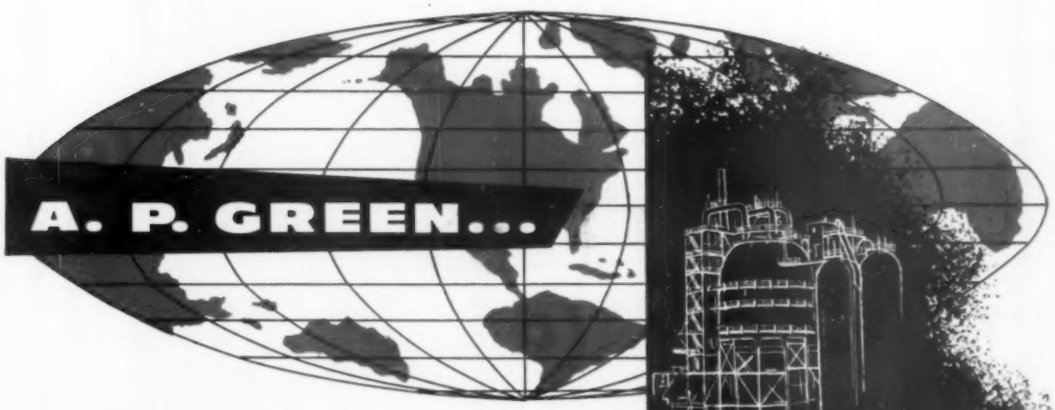
| | 1955 | 1956 | Preliminary 1957 | Estimated 1958 |
|---|---|---|---|---|
| Crude | 31 | 78 | 136 | 30 |
| Aviation gasoline | 52 | 55 | 51 | 50 |
| Motor gasoline | 43 | 42 | 55 | 35 |
| Kerosine | 9 | 9 | 14 | 7 |
| Distillate | 67 | 94 | 130 | 68 |
| Residual | 93 | 76 | 106 | 73 |
| Other products | 72 | 75 | 68 | 70 |
| TOTAL EXPORTS | 367 | 429 | 560 | 333 |

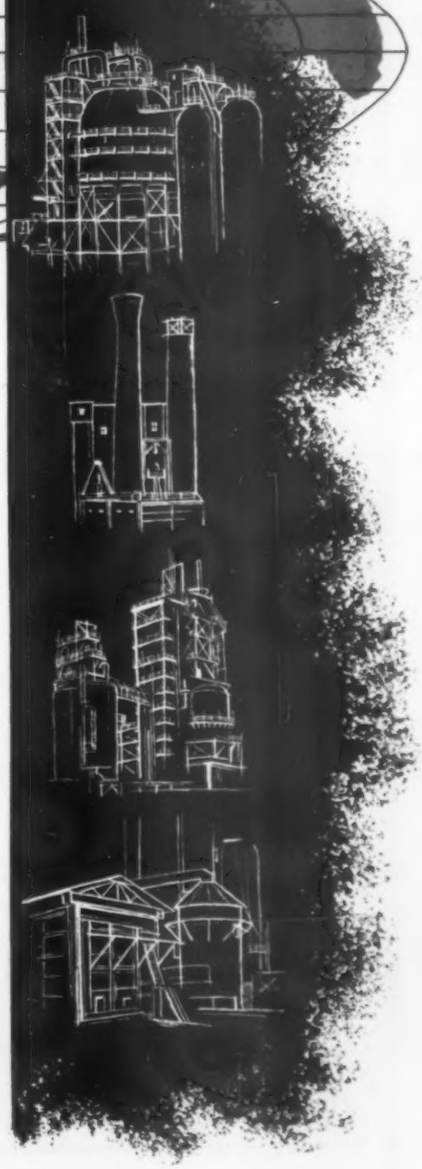
---

**USA IMPORTS**
(Thousands of Barrels Daily)

| | 1955 | 1956 | Preliminary 1957 | Estimated 1958 |
|---|---|---|---|---|
| Crude | 782 | 934 | 1,026 | 1,000 |
| Aviation gasoline | — | — | — | — |
| Motor gasoline | 13 | 18 | 5 | 7 |
| Kerosine | 5 | 5 | — | — |
| Distillate | 12 | 14 | 18 | 16 |
| Residual | 417 | 443 | 477 | 466 |
| Other products | 19 | 12 | 38 | 36 |
| TOTAL IMPORTS | 1,248 | 1,426 | 1,564 | 1,525 |

# THROUGHOUT THE WORLD...



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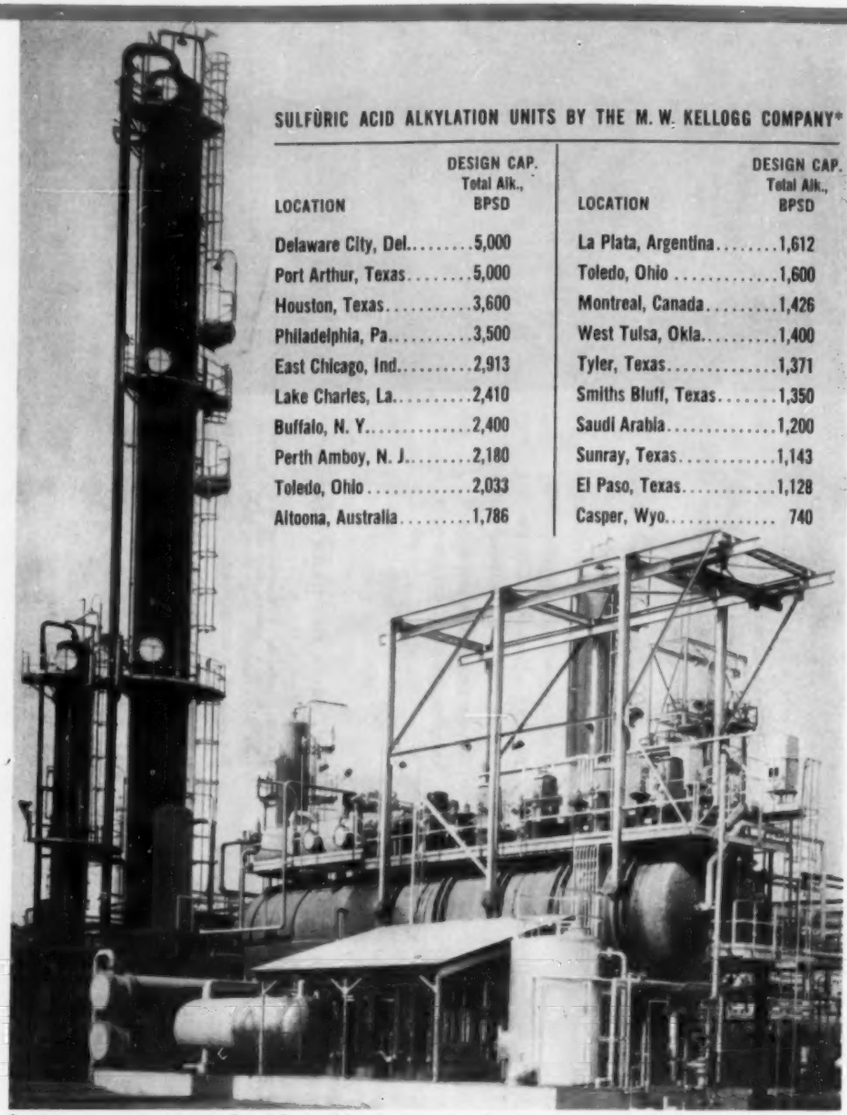

**SULFURIC ACID ALKYLATION UNITS BY THE M. W. KELLOGG COMPANY***

| LOCATION | DESIGN CAP. Total Alk., BPSD | LOCATION | DESIGN CAP. Total Alk., BPSD |
|---|---|---|---|
| Delaware City, Del. | 5,000 | La Plata, Argentina | 1,612 |
| Port Arthur, Texas | 5,000 | Toledo, Ohio | 1,600 |
| Houston, Texas | 3,600 | Montreal, Canada | 1,426 |
| Philadelphia, Pa. | 3,500 | West Tulsa, Okla. | 1,400 |
| East Chicago, Ind. | 2,913 | Tyler, Texas | 1,371 |
| Lake Charles, La. | 2,410 | Smiths Bluff, Texas | 1,350 |
| Buffalo, N. Y. | 2,400 | Saudi Arabia | 1,200 |
| Perth Amboy, N. J. | 2,180 | Sunray, Texas | 1,143 |
| Toledo, Ohio | 2,033 | El Paso, Texas | 1,128 |
| Altoona, Australia | 1,786 | Casper, Wyo. | 740 |

*List shows only units utilizing Kellogg's Cascade Reactor. Kellogg has also engineered and built many alkylation units of other types.

Measured by every standard . . . by quality and quantity of yield . . . by initial investment . . . by operating costs . . . M. W. Kellogg's sulfuric acid alkylation process is bringing optimum results to an increasing number of leading refiners both at home and abroad.

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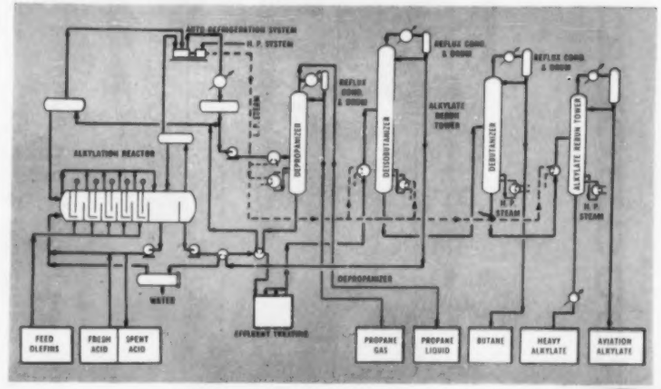
The M. W. Kellogg Company welcomes the opportunity to describe this alkylation process in detail, and to acquaint refiners with the improvements its engineers are continually making toward still greater economy and efficiency.




Refinery Process Division

**The M. W. Kellogg Company**

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**UNITED STATES—IMPORTING COMPANIES**
(Thousands of Barrels Daily)

| | Allocation Year 6/30/58 |
|---|---|
| **Established Importers:** | |
| Atlantic | 58.9 |
| Gulf | 111.6 |
| Sinclair | 62.2 |
| Socony | 67.1 |
| Standard of California | 66.8 |
| Standard (New Jersey) | 72.0 |
| Texas | 54.5 |
| Sub-total | 493.1 |
| **New Importers:** | |
| Cities Service | 32.6 |
| Eastern States | 18.3 |
| Gabriel (old importer) | 7.5 |
| Great Northern | 33.0 |
| International Rfgs. | 12.3 |
| Lakehead P. L. | 0.3 |
| Lake Superior | 5.0 |
| Northwestern | 13.5 |
| Phillips | 12.0 |
| Shell | 7.5 |
| Standard (Indiana) | 29.8 |
| Standard (Ohio) | 8.2 |
| Sun | 50.4 |
| Tidewater | 34.2 |
| Southwestern | 2.9 |
| Bay Refining | 3.2 |
| Dow Chemical | 0.3 |
| Texas Asphalt & Rfg. | 2.3 |
| Sub-total | 273.3 |
| Total | 766.4 |

the US Bureau of Mines' forecast of demand, the commission arrives at a "reasonable market demand," which is prorated among various producers in the state.

The Interstate Oil Compact Commission consists of one representative from each member state. In most states, the governor serves as representative—usually through a substitute or alternate. Meetings are also open to representatives of the federal government. Meetings take place about twice yearly, at which officers are elected—the most important of which is the executive secretary, who is charged with carrying out policy of the commission. The Interstate Oil Compact does not impose a general pattern on conservation legislation, and the conservation laws of the compacting states vary widely. The compact's function is primarily to study new methods of conservation, report them, and develop others.

## *Oil Law Summary*★

**EXPLORATION:** (Federal Law). **Duration:** 3 yrs. **Area:** 200,000 acres in any one state. **Transfer and Surrender:** See below:

**EXPLOITATION:** Two types, competitive leases and non-competitive leases. **Duration:** 5 yrs. primary term and so long thereafter as commercial production obtained. **Area:** 46,080 acres in one state per concessionaire for non-competitive. No limit competitive. **Royalty:** 12½%. **Surface Tax:** $1.00 per acre yearly minimum for competitive leases. For non-competitive, $.50 per acre first year, no tax second and third yr., $.25 per acre 4th and 5th yrs., $.50 per acre yearly thereafter. If within known geological structure of producing oil or gas field the tax is $1.00 per acre, unless included in cooperative unit plan when it is $.25 per acre yearly. **Bond:** $5,000 bond on beginning drilling operations. Non-competitive is $1,000. **Transfer:** Any time to person(s) qualified to hold a lease, with government approval. Assignments of royalty interests do not require government approval. **Surrender:** Any time. **Income Tax:** Federal Tax 52%. **Depletion Allowance:** 27½% gross income, up to 50% of net income. **Conservation:** Most states limit production to avoid "physical and economic waste."

★Taken from *World Petroleum Legislation*, 604 Fifth Ave., N. Y. 20, N. Y. (see p. 37-38)

It has six standing committees, which have more impact than any other force on oil and gas conservation practice.

The commission also concerns itself with public opinion, and represents the oil industry in Congress and before federal regulatory agencies. It is supported by the member states. Costs are small—the 1956 budget having been $98,500, the highest in the commission's history.

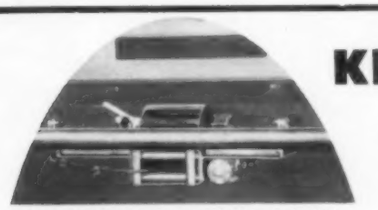
The outstanding fact about the commission is that it is a success. This primarily is because it (1) was desperately wanted as an alternative to federal control; (2) has never stepped outside its role as a research and promotional agency, instead has relied on the convincing power of facts; and (3) has received the support not only of the producing states, but of the federal government through the Connally hot oil act and in other ways. As a result, the commission is probably the most respected agency in the oil and gas industry, although it has no legal power.

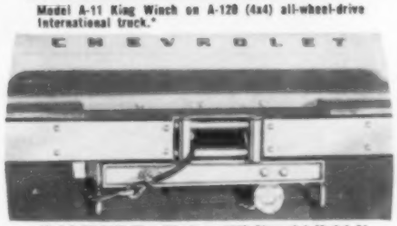
### OIL LAWS

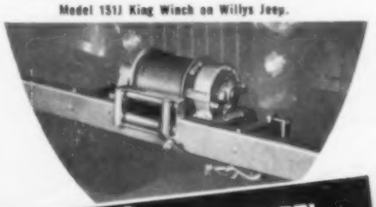
The generally favorable climate afforded by USA legislation for oil development and exploration continued without major change during 1957. The basic legislation is described in *World Petroleum Report 1957*.

The total of legislative proposals to Congress and state legislatures was enormous. More than 86,000 proposals for one type of legislation or another were introduced in state legislatures, while Congress considered more than 14,000 bills in 1958.

Two federal developments were especially important. The first was limitation of the depletion allowance as received by companies operating outside the United States. The O'Mahoney committee proposed this allowance be abolished or lowered due to the higher productivity of wells outside the USA. No action was taken, and none is likely on this proposal. Similar proposals were made to reduce the USA depletion allowance; but these, too,



Model A-11 King Winch on A-120 (4x4) all-wheel-drive International truck.*


Model CD-8116 King Winch on 1958 Chevrolet Model 31 (4x4).


Model 151J King Winch on Willys Jeep.

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are not considered likely to be passed.

The second development was the proposal by US Department of Justice to "not question, from an antitrust point of view, the joint activities of American oil companies related to foreign production, refining, or transportation of crude oil and refined products."

This deposition, made on the now-famous "cartel" case against Jersey Standard, Gulf, Texaco, Socal, and Socony, would appear to be the first clearcut government approval of the practice of combining several companies to explore abroad, as is now commonly done by USA companies not willing to risk a foreign exploratory campaign on their own. It would apparently be done at the expense of joint marketing, for the price for the government's dropping the cartel case apparently would be the disbanding of joint marketing operations overseas. There are two principal organizations involved, the Caltex group and Standard Vacuum Oil Co. The first is owned by The Texas Co. and Standard Oil Co. of California; and, since the parents do not have established marketing outlets overseas as do the owners of Standard Vacuum (Jersey Standard and Socony Mobil), the price for them would be high.

Seventeen state legislatures are scheduled to meet in either regular or budget session during 1958. Anticipated legislation includes: Gas-tax increases—Proposals for increased state gasoline taxes are a possibility in eight states—California, Kansas, Louisiana, Maryland, New Jersey, New York, Rhode Island, and West Virginia. Amendments banning service facilities on limited-access rights-of-way may be introduced in seven states—Kentucky, Maryland, Mississippi, New York, South Carolina, Virginia, and West Virginia. Proposals to enact some form of weight-distance tax on trucks can be expected in Kansas, Massachusetts, and Rhode Island. In addition, New York's present weight-distance levy may come up for amendment. Increased truck fees are a distinct possibility in two states—Kentucky and West Virginia. Legislation may be introduced in Mississippi to increase allowable truck weights and lengths. A decrease in the current gasoline-tax evaporation or collection allowance can be expected in three states—Kansas, Mississippi, and New York.

Others include: Legislation which would prevent the "good faith" reduction of prices to meet the equally low prices of a competitor may be considered in four states—Georgia, Maryland, Michigan, and Virginia. Investigations of petroleum prices are slated for introduction in two states—Georgia and Massachusetts. Three states—Massachusetts, Michigan, and Rhode Island—anticipate bills which would apply the utility concept of regulation to petroleum products. Legislation may be introduced in Virginia providing for a constitutional amendment prohibiting the use of highway-user revenues for other than highway purposes. An effort may be made in Georgia to repeal the amendment now on the books in that state. The Kansas legislature may consider bills to increase that state's severance tax. At least four states may consider some form of gasoline-tax relief—Kentucky (municipal use), Louisiana (complete exemption for farm use), Massachusetts (refunds for municipal buses), and West Virginia (refund for gasoline consumed on the West Virginia Turnpike). Three states—Kansas, Maryland, and West Virginia—are expected to consider increased sales-tax rates. END

**SOURCES OF ENERGY SUPPLY IN USA**

| | 1946 | 1956 | 1966 | Change 1966 from 1956 |
|---|---|---|---|---|
| | Quadrillion Btu | | | % |
| Natural gas | 4.1 | 9.9 | 15.6 | +57.6 |
| Coal | 14.5 | 12.0 | 13.8 | +15.0 |
| Water power | 1.4 | 1.8 | 1.8 | 0.0 |
| Petroleum | 10.5 | 18.4 | 30.1 | +63.6 |
| Total energy | 30.5 | 42.1 | 61.3 | +45.6 |

**WEST COAST ENERGY SUPPLY AND DEMAND**

| | 1946 | 1956 | 1966 | Change 1966 from 1956 |
|---|---|---|---|---|
| | Trillion Btu | | | % |
| Demand | 2,645 | 4,055 | 6,545 | + 61.4 |
| Supply | | | | |
| Liquid Petroleum: | | | | |
| Indigenous Production | 1,940 | 2,198 | 2,185 | — 0.6 |
| From Outside Sources | 35 | 517 | 1,910 | +269.4 |
| Subtotal | 1,975 | 2,715 | 4,095 | + 50.9 |
| Natural Gas: | | | | |
| Indigenous Production | 505 | 525 | 455 | — 13.3 |
| From Outside Sources | 25 | 695 | 1,815 | +161.2 |
| Subtotal | 530 | 1,220 | 2,270 | + 86.1 |
| Water Power | 105 | 225 | 320 | + 42.2 |
| Solid Fuels | 315 | 200 | 70 | — 65.0 |
| Total Supply | 2,925 | 4,360 | 6,755 | + 54.9 |
| Less: | | | | |
| Shipments and Stock Increment | 280 | 305 | 210 | — 31.1 |
| Net Energy Supply | 2,645 | 4,055 | 6,545 | + 61.4 |

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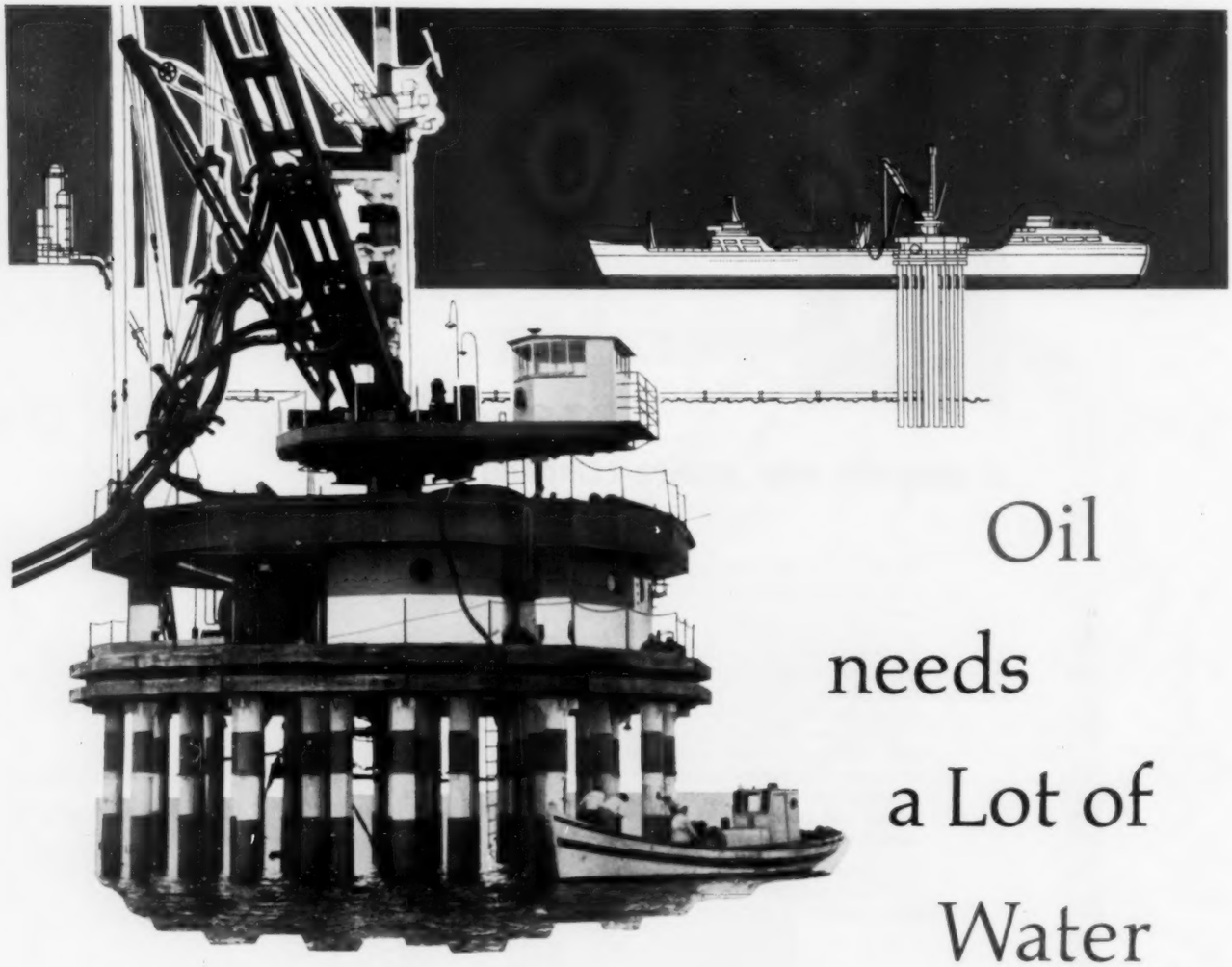

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now that it's moving in super-tankers, whose draught often prevents their tying up at port or refinery piers. The problem has been neatly solved with man-made islands that serve as tanker discharging stations. Recently one of these steel islands appeared four miles off the Adriatic coast. It stands on 36 Mannesmann seamless steel tubes. Two storeys high and 50 feet across, it is an ultra-modern tanker discharging station.

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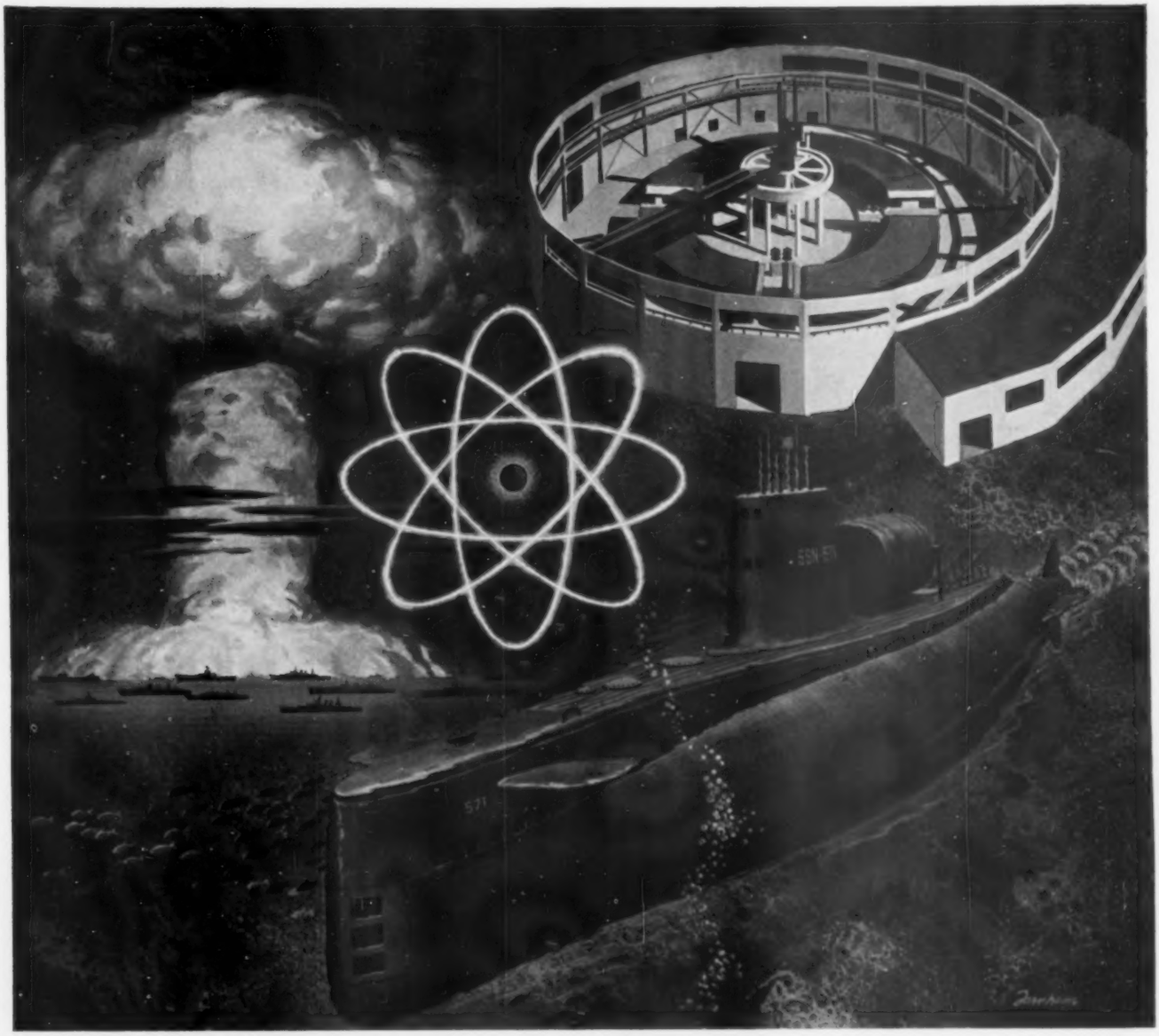
# CENTRAL AMERICA

BAHAMA ISLANDS
BRITISH HONDURAS
COSTA RICA
CUBA
GUATEMALA
HONDURAS
NICARAGUA
PANAMA
TRINIDAD



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# CENTRAL AMERICA

## PHYSICAL DEVELOPMENT

**Exploration:** Exploratory activity in the Central American and Caribbean areas was higher during 1957 than at any time in the past, and will increase during 1958. In Central America, the most active drilling country was Costa Rica—where Union Oil Co. of California has drilled its sixth unsuccessful exploratory well. The company went across the border into Panama, and drilled another well —without success. It is currently drilling on a new structure. In British Honduras, Gulf completed two wells, and then withdrew the rig early in 1957—only to come back later.

Activity is rising in two other Central American countries, which will see a total of at least four exploratory wells during 1958. Guatemala is the most active area, potentially. In Panama, exploration activity has been concentrated mainly on a rush to get concessions, which now blanket the country completely.

The Caribbean area slowed down during 1957, and seems likely to slow down further during 1958.

John W. Mecom interests drilled a dry hole in **Haiti,** and pulled out the rig. During 1956, Mark Edwin Andrews, independent oil producer of Houston, had completed his second and third tests—both dry. No favorable reservoir characteristics were reported in the sediments penetrated. Mecom likewise reported no shows in his well in Haiti. Commonwealth Oil Co. has remained interested in possibilities in the island. The Texas Co. began surface geological mapping in southern Haiti late in 1956. No wells by the company are known to be contemplated.

Pan Jamaican Oil Co. has drilled four dry wells, and so far has not obtained production in **Jamaica.** The latest well was at Negril—abandoned at 9,244 ft., with no shows. Pan Jamaican, which was originally called Jamaican Stanolind Oil Co., held a concession on the entire island of Jamaica contained in a number of exclusive oil prospecting licenses which include offshore areas 12 miles out on a farmout from Base Metals Mining Corp., of Toronto, Canada. The company drilled its first test well in 1956 at Santa Cruz, five miles south of Malvern, and abandoned it in March 1957, at 8,732 ft. A second exploratory well, Cockpit 1, was plugged and abandoned at 534 ft. in May 1957. Negril is the third well by the company. It is the fourth dry well in Jamaica. The first was drilled by Base Metals Mining Corp., a mile west. Pan Jamaican has now abandoned its search.

Cuba continued its intensive exploratory campaign without any positive results. The Bahamas Islands have not seen another exploratory well as yet. Trinidad made no major exploratory news during the first 11 months of 1957. However, an interesting well is drilling, Couva Marine 1, by Dominion Oil Ltd., offshore.

Interest revived in the **Dominican Republic** during 1956. There are some active oil and gas seepages in the Azua and Enriquillo valleys. Petrolera Dominicana CA, a syndicate of independent USA oil men, includes H. S. Cole II, Albert D. Fay, and Floyd Odlum, president of Atlas Corp., as stockholders. The company received a 2.1 million-acre exploration permit in the Cibao valley. A drilling rig is moving in. Pohly Exploration Co., of Tulsa, did gravity work for the company early in 1957. A shallow well is being drilled by Azuana Petroleum at Azua.

**Puerto Rico** is showing signs of oil activity also. A 64,000-acre concession was granted to William S. Wallis, of Toronto, Canada, and F. H. Crerie, of Houston. General geological work has been carried out.

Gulf Oil Corp. has drilled five dry holes—two of them gassers—in **Barbados.** The sixth well is now being prepared. A new and operable oil law was passed in January 1958.

**Production:** The only two producing areas in the Central American-Caribbean region are Trinidad and Cuba. Cuba's production declined slightly with depletion of old fields, while Trinidad's increased due to the stimulation of the Suez crisis. Combined production for the two is about 94,700 b/d, of which 93,700 b/d corresponds to Trindad. This is in excess of the area's consumption needs, and the Caribbean-Central American area as a whole is a net exporter of petroleum.

**Refining:** Refining activities in the Central American and Caribbean region have expanded sharply; in fact, the increase in this area is probably the fastest in the world during the past few years—especially in 1957. The region's total refining capacity is up to 896,175 b/d (including the large capacity of the Netherlands West Indies)—which is far in excess of its production or consumption.

Considerable interest was aroused during 1957 in a joint Central American refinery, which would be supported by five Central American countries. Refining proposals were also made in Costa Rica, and in Guatemala for small plants.

**Marketing:** Total consumption of the region was about 317,000 b/d (including Netherlands West Indies)—expressed in barrels of crude equivalent.

## OIL LAWS

Activity in new oil legislation was especially high in Central America. There, new laws were passed or drafted in Nicaragua, Honduras, Costa Rica, and Puerto Rico. No major changes occurred in the legislation in any of the other countries of Central America or of the Caribbean region.

**Haiti**—which has been trying to pass a new oil law for some years—was again unable to formulate a petroleum code because of political uncertainty and unrest.

## NATIONAL FACTORS

The investment favorability of the region as a whole improved during 1957. The favorable attitude of governments of Central America, intrigued by Guatamala's success with her more liberal attitude, has brought about passage of several laws easing restrictions on foreign investment in general, and drafts for new oil laws.

For a region which is chronically unstable, political stability was good during 1957; Haiti suffered through political unrest, and so did Cuba; however, Cuba's unrest did not slow oil exploration; but Haiti's political unrest did.

The rapid accession to power of Luis Somoza, following his father's death, maintained stability in **Nicaragua.** Guatamala's new president also assumed rapid and effective control following the assasssination of President Castillo.

Economically, the region was more stable in 1957 than in 1956. This was due to a general high level activity in the United States, on which most of this area depends.

Exchange restrictions are not the rule in the Caribbean region, where such countries as Panama, Cuba, Guatamala, Puerto Rico, and others do not have exchange controls. The British-controlled areas continued to restrict exchange transactions, as did Costa Rica. However, with increased exchange availabilities, the restrictions were not increased during 1957.

END

**CENTRAL AMERICA & CARIBBEAN—ESTIMATED CONSUMPTION OF PETROLEUM PRODUCTS**

(Crude-Equivalent Basis—Thousands of Barrels Per Day)

| Country | 1957 | % Change 1957 Over 1956 |
|---|---|---|
| Central America | 44 | + 4.8 |
| Cuba | 72 | +10.8 |
| Netherlands West Indies | 134 | + 2.3 |
| Puerto Rico | 33 | +13.8 |
| Trinidad | 34 | + 3.0 |
| Total Central America and Caribbean | 317 | + 6.9 |

**JAMAICA—IMPORTS**

| | Unit | (Jan.-June) 1957 | 1956 |
|---|---|---|---|
| Aviation gasoline | gal | 3,742,452 | 6,229,712 |
| Motor gasoline | " | 9,169,654 | 15,349,437 |
| Kerosine | " | 3,493,924 | 5,840,139 |
| Heavy diesel } Light diesel } | " | 35,282 | 56,397 |
| Fuel oil | ton | 202,160 | 312,394 |
| Lubricating oils | gal | 596,722 | 1,078,403 |
| Other lubricating oils and greases | " | 21,147 | 40,129 |
| Lubricating greases | lb. | 759,639 | 732,958 |
| Gas oil | ton | 35,343 | 31,749 |

**CENTRAL AMERICA & CARIBBEAN—CRUDE-OIL PRODUCTION AND RESERVES**

| | Production 1957 (Barrels Per Day) | Reserves (a) (Millions of Barrels) |
|---|---|---|
| Cuba | 1,000 | 3 |
| Trinidad | 93,700 | 300 |
| Totals | 94,700 | 303 |

a Estimated for each country as of the latest data available.

**REFINERIES AND CAPACITY—CENTRAL AMERICA & CARIBBEAN**

| Name of Country | Number of Plants | Crude Capacity (Barrels Daily) | Cracking Capacity (Barrels Daily) |
|---|---|---|---|
| Cuba | 5 | 53,675 | 3,300C |
| Netherlands West Indies | 2 | 650,000 | 460,000TC |
| Puerto Rico | 2 | 65,500 | 58,000C |
| Trinidad | 3 | 127,000 | 48,000TC |
| Total Central America and Caribbean | 12 | 896,175 | 569,300 |

Under cracking capacity to indicate type: T—Thermal. C—Catalytic.

# HONDURAS

### PHYSICAL DEVELOPMENT

**Exploration:** There are two principal concession holdings in the country—one of which belongs to Petrolera Hondurena SA, which covers about 48 million acres along the north coast, with about 16 million on land and the rest offshore. John W. Mecom acquired this concession in 1956, and drilled a dry test at Laguna Canatasca on the Caribbean coast to a total depth of 6,950 ft. Barnwell Offshore Inc. acquired a half-interest in the company during 1957, and will drill two deep wells—one offshore and one on land in the department of Gracias y Dios. The deep test first had been scheduled for August 1, 1958.

A group of Texas independents acquired about 10.3 million acres which evidently first had been acquired by Lester Foran and L. S. Holmes, also of Texas. A seven-member syndicate purchased the concessionaire company, Petroleos Hondurenos SA, consisting of Georesearch Inc., Harold D. Byrd, American Maracaibo Co., Oil & Gas Property Management Inc., Justiss-Mears Oil Co., McRae Oil & Gas Corp., and Western Hemisphere Inc. The latter was formed recently to consolidate holdings of Russell Cobb, Jr., Tulsa independent, and several associates.

### OIL LAWS

No changes are known to have occurred in the oil regulation of Honduras as it was summarized in *World Petroleum Report 1957*. A revision currently (December 1957) is being considered, according to reports, but no law has been passed. The present law is considered favorable to operations by foreign private capital.

### NATIONAL FACTORS

No changes have occurred in the factors bearing on investment favorability. There are still no restrictions on exchange. Tax rates remain at 3% to 30% on about $500,000 income. The unit of currency, the lempira, remains steady at 50 US cents as it has since 1926. There are no restrictions on import or export of capital or profits.

The military junta which assumed power October 21, 1956, carried through its promise of free elections. A liberal government was installed. Its attitude toward foreign private investment appears to be favorable.

For a more detailed review, see *World Petroleum Report 1957*. END

# BRITISH HONDURAS

### PHYSICAL DEVELOPMENT

British Honduras Gulf Oil Co., a subsidiary of Gulf Oil Corp., is the only concessionaire and exploring company. It held 30 licenses—over the entire country—until recently, when all but 4,442,000 acres in the north were surrendered. A mining lease was taken over about 1,000 square miles—with a one-year extension granted on prospecting licenses held by the company in the north. A 50% interest in the area was obtained by Shell Petroleum Co. Ltd. late in 1957.

Two dry holes, Yalbac 1 and Hillbank 1, were drilled in 1956. One was drilled in 1957, Roaring Creek 1, to 3,683 ft.—where it was abandoned after shows of oil had been found in a 3-ft. section at 2,685 ft. Two currently are drilling—Tower Hill and Retaliation 1.

### NATIONAL FACTORS

No change occurred in the various factors affecting investment favorability during the year. The major factors on the favorable side include a stable government—with a sympathetic attitude toward oil development—and income-tax exemption on companies "contributing to development." Unfavorable ones are the small size of the country; the difficult operating terrain, which is swampy and tropical on the coast, with limited transportation facilities; and exchange control, which is that of the sterling area (British Honduras is a crown colony). Income tax is 40%, with no depletion allowance. END

### OIL LAWS

The oil laws are somewhat vague, and during 1958 changes are being made in the manner of computing royalties and to clear up other aspects. At one time the government was reported considering an increase in exploration fees—which might have caused concern to Gulf Oil Corp. However, the new legislation is expected to be beneficial, both as regards clarity and possibly the amount of acreage which may be taken under lease.

## Oil Law Summary★

**RECONNAISSANCE:** 2 yrs. with 1-yr. renewal.

**EXPLORATION: Duration:** 4 yrs. with one 1-yr. renewal. **Area:** Max. 500 sq. mi. for exploration. Reconnaissance unlimited. **Ownership:** No restriction. **Transfer:** With govt. permission. **Taxes:** Application US $70. Annual rental per sq. mi. 70¢ for each year of initial term, $1.40 each yr. thereafter. **Royalty:** Max. 12½% crude value; 1.4¢ per mcf on gas sold, reduced ½ if sold for repressuring. Deductible from rentals. **Drilling Obligation:** Test drilling (to be defined in concession) on two or more licensed areas.

**EXPLOITATION:** Grantable to former licensee. **Duration:** 30 yrs. Renewal not to exceed 30. **Area:** Max. 100 sq. mi. per concession and per concessionaire. **Ownership:** No restriction. **Taxes:** Application fee $105. Annual sliding rental per acre from initial 35¢ up to $1.05 beginning 10th yr. Deductible from royalty. **Royalty:** Max. 12½% on crude value; 2.8 per mcf on natural gas sold, reduced ½ if sold for repressuring. Mining lease provides periodic revision of royalties. **Income Tax:** 40% maximum.

★Taken from *World Petroleum Legislation*, 604 Fifth Ave., N. Y. 20, N. Y. (see p's 37-38)

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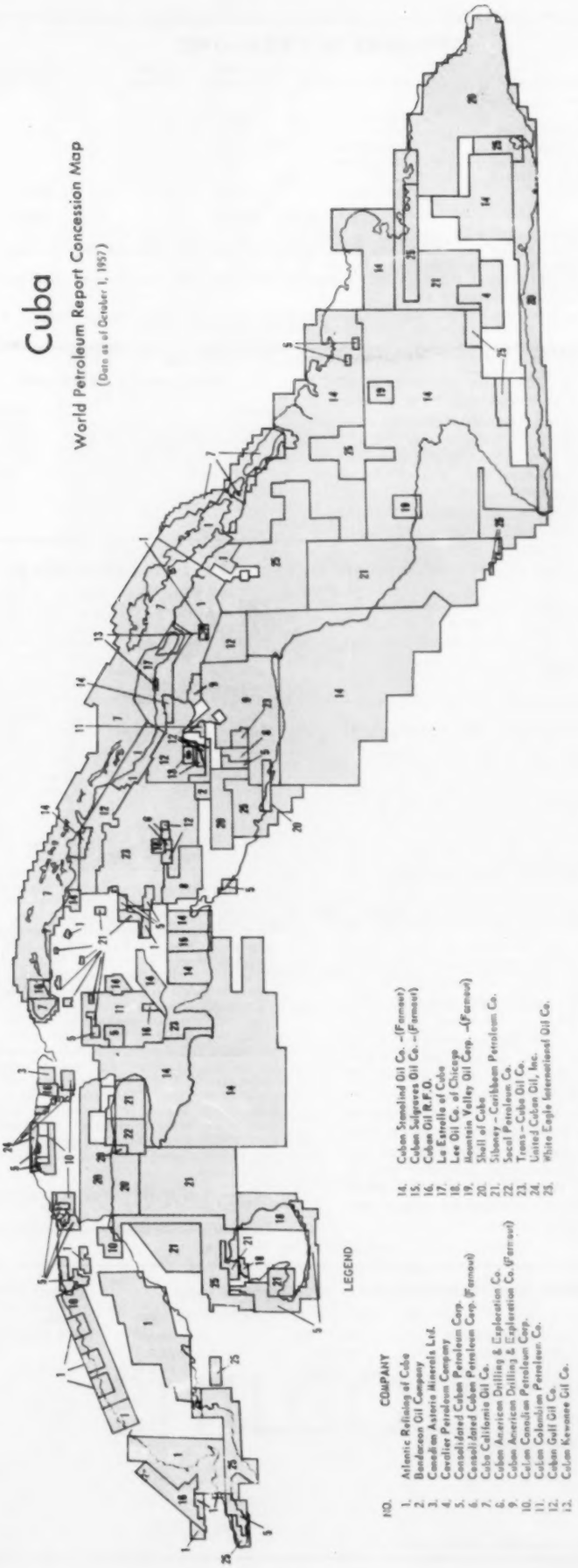
# CUBA


Cuba
World Petroleum Report Concession Map
(Date as of October 1, 1957)
LEGEND
NO. COMPANY
1. Atlantic Refining of Cuba
2. Bandercon Oil Company
3. Canadian Astoria Minerals Ltd.
4. Cavalier Petroleum Company
5. Consolidated Cuban Petroleum Corp.
6. Consolidated Cuban Petroleum Corp. (Farmout)
7. Cuba California Oil Co.
8. Cuban American Drilling & Exploration Co.
9. Cuban American Drilling & Exploration Co. (Farmout)
10. Cuban Canadian Petroleum Corp.
11. Cuban Colombian Petroleum Co.
12. Cuban Gulf Oil Co.
13. Cuban Kewanee Oil Co.
14. Cuban Stanolind Oil Co. -(Farmout)
15. Cuban Sulgreen Oil Co. -(Farmout)
16. Cuban Oil R.F.O.
17. La Estrella of Cuba
18. Lee Oil Co. of Chicago
19. Mountain Valley Oil Corp. -(Farmout)
20. Shell of Cuba
21. Sibaney - Caribbean Petroleum Co.
22. Socal Petroleum Co.
23. Trans - Cuba Oil Co.
24. United Cuban Oil, Inc.
25. White Eagle International Oil Co.

## PHYSICAL DEVELOPMENT

**Exploration:** Cuban exploration has been stimulated by the many surface oil seeps known in Cuba since the discovery of the island. Bacuranao shallow serpentine oil field in Havana province was discovered in 1864; Motembo shallow serpentine naphtha field in Las Villas province, in 1880; Jarahueca shallow serpentine oil field in Las Villas province, in 1943. In 1943, production of the three fields exceeded 150,000 bbl per year. In 1946, it reached 250,000 bbl per year, and then fell to less than 50,000 bbl per year in 1951.

Early in 1954, Dr. Antonio Iglesias started drilling Echevarria No. 1; it had been inactive. On May 1, 1954, the well came in at about 200 b/d flush production from 1,072 ft. The present surge of oil interest actually dates from May 1, 1954, when heavy oil flowed from this discovery well, Cuba's first Cretaceous producer.

Expenditures and commitments for exploration and drilling in Cuba were estimated at $3 million in 1954, $15 million in 1955, and $40 million in 1956. 1956 and 1957 saw the consolidation of most Cuban acreage into the hands of a relatively small number of large companies, and a decline in exploration.

Atlantic Refining planned a series of eight test wells in 1957—at least four of which were to be deep holes. The Texas Co. has finalized its agreement with Gulf which will result in four deep-test wildcats in Las Villas province in central Cuba. Stanolind has finished its island test off the south coast of Las Villas for a projected deep test. Shell spudded a deep test off the north coast, near where it drilled more than 10 years ago. Partners with Shell in the venture are Standard of New Jersey and Atlantic Refining. Standard of California has had field parties working off the north coast. Kewanee, an independent, has started a deep wildcat on a Gulf farmout.

Rotary oil rigs in Cuba totaled 3 in 1953; 8 in 1954, 14 in 1955, 16 in 1956, and 17 in 1957.

Wells drilling totaled 12, December 31, 1954; 11, December 31, 1955; 16, December 31, 1956; 11, July 1, 1957.

Geophysical activity (including seismograph, magnetometer, and gravimeter) totaled 28 crew-months in 1954, 35 crew-months in 1955, 80½ crew-months in 1956, and 27½ crew-months in 1957 (first 6 months).

**Production:** The country's production of crude has been dropping as older fields decline and the Jatibonico discovery also declines. It was down to 1,067 b/d during the first half of 1957, compared with about 1,500 b/d during 1956.

**Refining:** In 1956 there were two refineries in operation—the 2,000 b/d Refineria Cabaiguan and the 9,400 b/d Esso Belot refinery. Shell has built and put onstream a 28,500 b/d plant on Havana Bay; The Texas Co. (West Indies) Ltd. has also put onstream a 20,000 b/d plant at Santiago de Cuba; Esso Standard Oil ex-

**CUBA—GEOLOGICAL AND GEOPHYSICAL EXPLORATION**

| | Party-Months |
|---|---|
| 1957 (1st 6 months) | 27½ |
| 1956 | 80½ |
| 1955 | 35 |
| 1954 | 28 |

### CUBA—WELL DATA

| | 1957 (1st 6 mos.) | 1956 |
|---|---|---|
| Exploratory wells completed: | 21 | 43 |
| Oil producers | 0 | 2 |
| Dry | 21 | 41 |
| Development wells completed: | 24 | 57 |
| Oil producers | 11[a] | 25[a] |
| Dry | 13 | 32 |
| Total wells completed | 45 | 100 |
| Footage drilled: | | |
| Exploratory | 50,000[c] | 178,515[c] |
| Development | 53,864[c] | 100,000[c] |
| Total exp. and development | 103,864 | 278,515 |
| Rigs drilling as of Dec. 31[b]: | (as of 6/30/57) | 12/31/56 |
| Rotary | 1 | 7 |
| Cable-tool | 10 | 9 |
| Exploratory | 1 | 6 |
| Development | 10 | 10 |
| Total rigs | 11 | 16 |
| Total wells drilled (cumulative from 1954) | — | 261 |
| Total oil producers end of year | — | 247[d] |

[a] Includes 200 naphtha producers in Motembo; these wells are bailed.
[b] Does not include wells shut down for Christmas holidays.
[c] The amounts of exploratory and development drilling are estimated; the total figure is, however, final.
[d] Includes 7 distillate producers in Motembo field.
[e] Includes 12 distillate producers in Motembo field.

pected to have its Belot refinery expanded to 35,000 b/d by the end of 1957. By mid-1958, Cuba will be refining 85,500 b/d.

Refinery processing averaged: 9,000 b/d in 1954; 10,000 b/d in 1955; 11,400 b/d in 1956; 40,200 b/d in 1957 (to July 1).

### OIL LAWS

No significant changes occurred in Cuba's oil regulation during 1957. The present exploration boom is aided by the favorable oil law.

Refining operations were encouraged by Law-Decree No. 1758, November 2, 1954, which granted special benefits to refineries. Regulations for the administration of Law-Decree No. 1758 of 1954 (Presidential Decree No. 3862) were issued, November 30, 1955. The law grants substantial tariff and duty exemption for a period of 20 years, both to new refinery projects and to enlargements of existing plants. It further provides that no additional taxes will be levied during the 20-year period, and offers new refineries many of the advantages accorded new industries. The law-decree permits interest paid on loans for construction to be deducted before profit taxes are paid, and protects the price structure in many ways.

### NATIONAL FACTORS

Political stability was the only factor affecting investment favorability which changed drastically during 1957. The government of President Batista is threatened by a revolution led from within the country, and considerable political unrest occurred during the year. A revolution would lead to a less favorable government attitude; but, since Cuba is closely tied economically to the United States, the general attitude would probably remain friendly. As mentioned in *World Petroleum Report 1957*, there are no exchange restrictions, and the Cuban peso is exactly equivalent to the US dollar.

The labor situation, which has been troublesome to other industries in the past, has been satisfactory so far as oil is concerned. The labor code is restrictive, however.

### REFINERIES IN CUBA—1957

| *Name of Company* | *Plant Location* | *Crude Capacity* | *Type Plant* | *Cracking Capacity* |
|---|---|---|---|---|
| Cia. Petrolera Shell de Cuba SA | Havana [1] | 28,500 | S | — |
| Esso Standard Oil SA | Belot [2] | 9,400 | S | — |
| Refinería Cabaiguán | Cabaiguán | 2,000 | S | — |
| Refinadora Bacuranao | Bacuranao | 175 | S | — |
| The Texas Co. (West Indies) Ltd. | Santiago [3] | 20,000 | S | 3,300 |
| | Total | 60,075 | | 3,300C |

[1] Plant includes 9,500 b/d Platformer.
[2] Refinery replaced by new 35,000 b/d plant; onstream end 1957. Includes fluid cracking unit, Hydroforming, and Hydrofining units.
[3] Plant went onstream 1 October 1957. Equipment includes 3,300 b/d catalytic reformer and 4,100 b/d Hydrotreating unit.

Capacities are in barrels per day. Key to type of plant: S—skimming. Under cracking capacity to indicate type: C—catalytic. All data as of December 1, 1957.

### CUBA—WAGE RATES—1955 (US $)

| Employment | Pay Per Month |
|---|---|
| Messengers | 90.00 to 116.00 |
| Stenos (Spanish) | 120.00 to 187.00 |
| Stenos (bilingual) | 200.00 to 296.00 |
| | **Pay Per Hour** |
| Unskilled labor | 0.71 to 1.07 |
| Mechanics, 1st class | 1.25 to 1.83 |

### *National Factors Summary*

**Area:** 44,206 sq. mi. **Pop. (1953):** 5,807,057. **Income Tax:** Max. 36% on income over $1 million; 25% excess profits tax. **Political:** Unstable. Attitude favorable. **Wages:** Low: $1.07 per hr. unskilled; $1.83 per hr. skilled. **Exchange Rate:** 1 peso per US dollar. **Exchange Restrictions:** None.

The principal reason for a decrease in some types of oil activity in Cuba in 1957 is due to the failure of the government to issue legislation clarifying certain points in the existing oil laws. A major source of confusion is the argument over the wording of Decree No. 1526 of 1954. Sizable blocks of land had fallen into the State reserve; the decree released these areas so that they could be granted to applicants. The confused wording of the decree left it debatable as to what date these reserves had been freed. Those who interpret the decree to mean the State reserves were freed on July 29 applied for concessions on most of the available areas; those who consider that a later modification resulted in releasing State reserves on August 15 applied for other concessions on the same areas.

### *Oil Law Summary*★

**EXPLORATION: Duration:** 3 yrs. No extensions. **Area:** Max. per concession 79,073 acres; max. per concessionaire, 741,312 acres. **Ownership:** See National Reserves below. **Surrender:** Any time. **Taxes:** Preliminary govt. expense deposit (unspecified) required. **Annual Surface Tax:** 2 US cents per acre till July 8, 1959, then 6 US cents per acre. **Drilling Obligation:** None. **Special Incentives:** Govt. will loan $666,667 per million dollars exploration investment in drilling, repayable with 10% interest if discovery is made, plus additional royalty. Repayment not required if no discovery is made.

**EXPLOITATION: Duration:** 30 years. **Area:** Max. per concession 19,768 acres; max. per concessionaire 741,312 acres. **National Reserves:** ⅛ exploitation area, plus and surrendered or forfeited concessions from national reserve. Grantable on bidding basis to Cuban companies only, with no shareholding restrictions. **Surrender:** Any time. **Surface Tax:** 4 US cents per acre 1st 10 yrs., 8 US cents 2d 10 yrs., 16 US cents 3d 10 yrs. **Royalty:** 10% wellhead value, reduced to 9% if oil refined within Cuba. Additional royalty (if loan taken) 2.5% on 1000 b/d production to .25% on 50,000 b/d. **Drilling Obligation:** One well per every 19,768 acres within 5 yrs. to 4,000 ft. unless minimum 122 b/d production encountered. Exploration drilling may be counted in this. Thereafter at least one well every 5 yrs. to expiration. **Income Tax:** Max. 36%. Exemption from profits tax (10%) and capital tax granted for 10 yrs. to companies spending $1 million on exploration.

★Taken from *World Petroleum Legislation*, 604 Fifth Ave., N. Y. 20, N. Y. (see p's 37-38)

### CUBA—PRODUCTION AND DRILLING DATA

| Name of Field | Year Discovered | Number of Wells[1] Flowing | Number of Wells[1] Pumping | Depth (Feet) | Producing Formation | Base Type | API Gravity | Average Production (Barrels per day) 1957 (1st 9 Mos.) | 1956 |
|---|---|---|---|---|---|---|---|---|---|
| Bacuranao | 1864 | 0 | 0 | 500-2,000 | Shallow serpentine | Paraffin | 28.0 | — | — |
| Motembo[2] | 1880 | 0 | 200[3] | 400-1,700 | Shallow serpentine | Naphtha | 60.0-62.0 | 15.2 | 17.2 |
| Jarahueca | 1943 | 0 | 6 | 500-3,000 | Shallow serpentine | Paraffin | 38.0-40.0 | 19.7 | 87.6 |
| Jatibonico | 1954 | 0 | 26 | 1,100-1,300 | Shallow sedimentary | Asphalt | 15.0-16.0 | 739.0 | 1,080.2 |
| Cruz Verde[4] | 1955 | 0 | 10 | 1,000-1,300 | Shallow serpentine | Paraffin | 28.0 | 124.0 | 302.9[5] |
| Santa María del Mar | 1955 | 0 | 4 | 2,200-6,000 | Shallow and deep serpentine | Paraffin and asphalt | 16.0-28.0 | 85.3 | — |
| Catalina | 1956 | 0 | 1 | 7,000 | Deep sedimentary | Paraffin | 32.0 | 25.8 | — |
| Guanabo | 1956 | 0 | 0 | 1,400-2,200 | Shallow sedimentary | Asphalt | 8.0-11.0 | 52. | — |

[1] As of January 1, 1957.
[2] Distillate field.
[3] Bailed.
[4] Possible extension of old Bacuranao field.
[5] Includes Bacuranao, Santa María del Mar, & Guanabo production.
[6] Includes Bacuranao & Santa María del Mar production.

Total reserves of country: 3,000,000 bbl., as of November 1, 1957.

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# COSTA RICA

## PHYSICAL DEVELOPMENT

**Exploration:** Cia. Petrolera de Costa Rica, subsidiary of Union Oil Co. of California, has continued exploration following the discovery at Cocolas 1, described in *World Petroleum Report 1957*. The well found good shows of oil at 5,450 ft. in a pay section of 114 ft. A second well, Cocolas 2, found 72 ft. of pay nearby, but both wells were noncommercial, and quickly went to salt water. They demonstrated the presence of petroliferous sediments capable of producing oil, but so far no trap has been found where it can be handled in commercial quantities.

Cocolas 3 was drilled about 1,200 ft. from Cocolas 2 during early 1957. It was abandoned at just below 5,000 ft., with no shows. Another well, Cocolas 4, was drilled to 7,000 ft. and abandoned, with no shows reported.

Union moved in another rig and began drilling another well, its eighth, about November on an entirely new structure near Limon Port, close to the railway center of Liverpool. An access road to the site was constructed at considerable cost. The company's expenditures have been around $6 million to this writing. The new well is Victoria 1.

During the year Union obtained a two-year extension of its exploration contract due to expire November 17, 1957. No concessions are being granted to other companies pending the passage of a new oil law, as later described.

**Production, Refining, Marketing:** There is neither production nor refining in Costa Rica. A proposal for a 4,000 b/d refinery was submitted during 1956, but no action has been reported taken on it. Marketing requirements within the country are supplied by Esso, Union, Standard of California, and Texaco companies through the ports of Punta Arenas, Caldera, Quipos, and Golfito on the west, and Porto Limon on the east. During 1957, they amounted to an estimated 2,900 b/d. California Standard signed a 20-year contract with the government, August 1, to distribute products, and plans service stations along Inter-American Highway; bulk substations, marine terminal at Punta Arenas. Union contract expires 1963, Texaco's and Esso's in 1961.

## OIL LAWS

A new oil law currently is being formulated by Costa Rica. It will replace the present regulation, which consists of the General Mining Law of 1953 and the sum of concession requirements as contained in the Union Oil agreement.

The new law provides for an exploration period of four years, extendible by two years if at the end of the original term the concessionaire has a 12,000-ft. rig working.

Maximum area per exploration concession is 30,875 acres. A total of 30 such lots may be received by one concessionaire for a maximum per concessionaire of 926,250 acres.

An annual surface tax of 7.2874 US cents per acre is assessed. It is deductible in part from taxes paid.

Exploitation concessions have a 40-year term, with no provision for extension. Maximum area is 50% of the exploration area, up to a maximum of 370,000 acres per concessionaire. The proposed law calls for a division of 50% profits to the State and 50% to the concessionaire, after commercial production has been achieved. Royalty payable is 16 2/3% of gross production, deductible from the 50-50 profits division.

Present regulation of oil exploration in the country is covered in *World Petroleum Report 1957*. There is no oil law, and regulation is mostly by special contract. The provisions of the only contract in the country, with Union Oil Co., are about the same as the proposed law outlined previously.

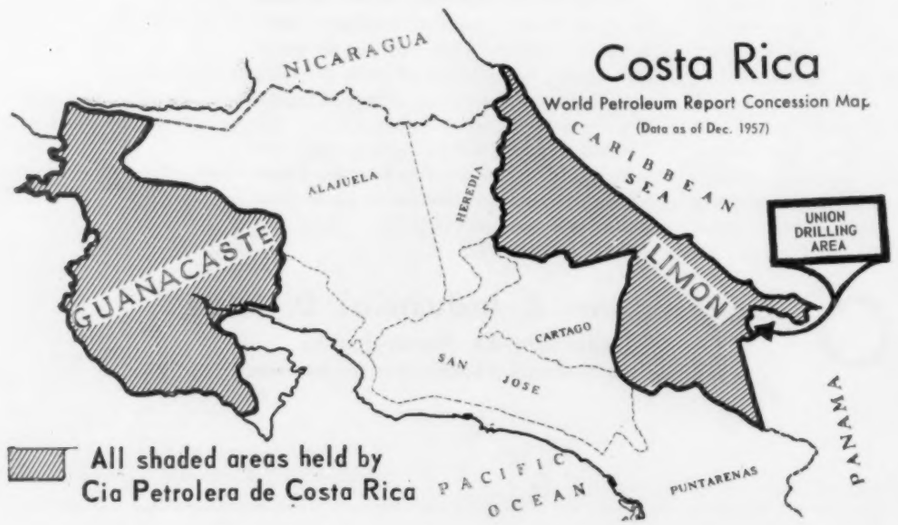
## Oil Law Summary★

*Note: No petroleum law at present; following are provisions of proposed law.*

**EXPLORATION: Duration:** 4 yrs., extendible for two more if rig working capable of drilling to 12,000 ft. **Area:** Max. per concn., 30,875 acres. Max. per concessionaire, 926,250 acres. **Ownership:** No restriction. **Taxes:** Surface tax 7.2874 US cents per acre yearly, partly deductible from exploration expenses.

**EXPLOITATION:** May cover ½ exploration area. **Duration:** 40 yrs., no extensions. **Area:** Max. per concn., 15,337.5 acres (half explr.); max. per concessionaire, 370,500 acres. **Taxes:** Not known. **Royalty:** 16 2/3%. **Income Tax:** 50-50 division of profits between concessionaire and govt. to be effected when commercial production achieved. **Income Tax:** 30% maximum.

★Taken from *World Petroleum Legislation*, 604 Fifth Ave., N. Y. 20, N. Y. (see p. 37-38)




## NATIONAL FACTORS

There have been no important changes in the national factors affecting investment favorability from those given in detail in *World Petroleum Report 1957* and summarized hereinafter:

### National Factors Summary

**Area:** 19,690 sq. mi. **Pop. (1956):** 1,013,000. **Currency:** Colon, 17.9 US cents, official rate. Free rate, 15 US cents. **Exchange Restrictions:** Multiple exchange rates. Foreign capital pays official rate. Profit and capital remittances subject to government permission. **Income Tax:** Max. 30% on $89,050 and over. END

# BAHAMA ISLANDS

### PHYSICAL DEVELOPMENT

**Exploration:** Interest in the Bahamas was aroused during the Suez crisis, but by the end of 1957 had died down somewhat. There are five companies exploring: Bahama California Oil (Standard Oil Co. of California); Bahamas Exploration Co. (Gulf Oil Corp.); Bahama National Oil Co. (National Oil Co. of California); Bahamas Sun Production Co.; and International Petroleum Co. The last is a local company, not related to the SONJ affiliate.

No drilling or seismic work was done during 1957. Seismic work was done by Western Geophysical for Socal, Gulf, and Sun during 1956. A wildcat well, the second in the Bahamas, is being considered by Bahamas Exploration and Bahama California, which did joint seismic work during 1956. However, no decision to drill has as yet been reached. Only one hole has been drilled, by Superior Oil Co. in 1945.

**Production, Refining, Marketing:** There is neither production nor refining. Imports for domestic consumption are very small.

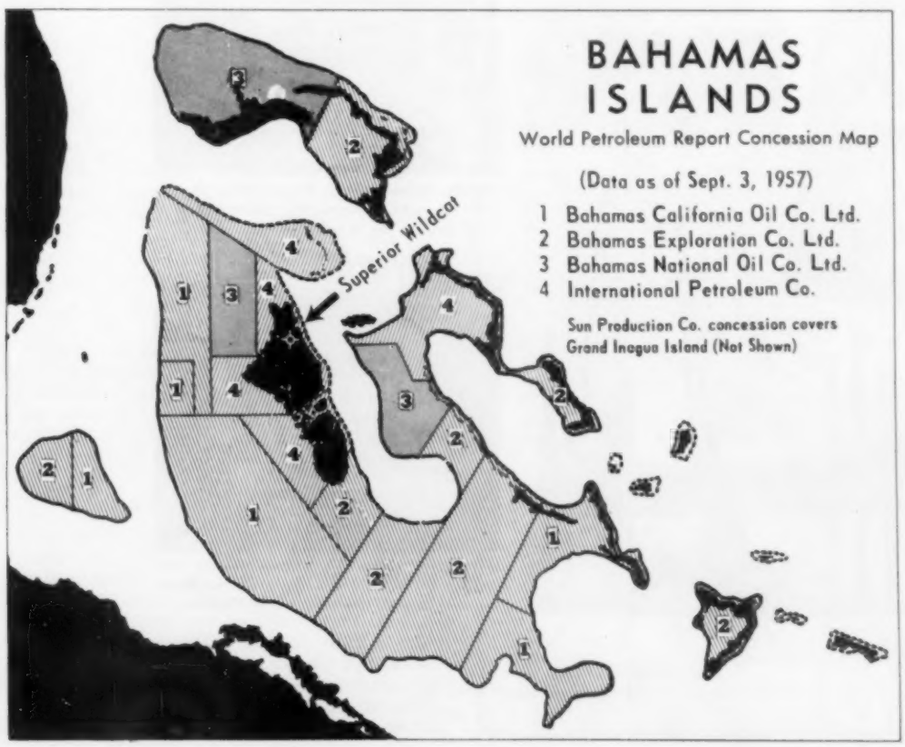
### OIL LAWS

A significant change occurred during 1957. An amendment permits direct operation by foreign concerns without formation of a local company. This permits deduction of exploration expenses from the USA income tax. However, a proviso was incorporated requiring formation of a local company within five years after beginning commercial oil exports unless "substantial financial injury would result." The same amendment specified one member of the board of such local company must be nominated by the government.

### NATIONAL FACTORS

The same factors apply as cited in *World Petroleum Report 1957*, with the exception that oil companies exploring need no longer be incorporated in the Bahamas.

The local "Tongue of the Ocean," leading down east of New Providence Island, is a deep-water entrance way which would be suitable for tankers—an important consideration, since water around the Bahamas is rarely more than 20 ft. deep. END


BAHAMAS ISLANDS
World Petroleum Report Concession Map
(Data as of Sept. 3, 1957)
1 Bahamas California Oil Co. Ltd.
2 Bahamas Exploration Co. Ltd.
3 Bahamas National Oil Co. Ltd.
4 International Petroleum Co.
Sun Production Co. concession covers Grand Inagua Island (Not Shown)
Superior Wildcat

## Oil Law Summary*

**EXPLORATION:** Law recently amended to permit participation by foreign companies without local company formation. **Duration:** Reconnaissance 2 yrs.; exploration 4 yrs.—each with one 1-yr. renewal permissible. **Area:** Max. total reconnaissance, 960,000 acres onshore and 9,600,000 acres offshore. Max. total exploration area, 128,000 acres. **Ownership:** Reciprocity; i.e., aliens whose country of origin denies equal rights to British citizens are excluded. **Surrender:** 3 mos.' notice. **Transfer:** With govt. consent. **Fiscal:** Max. initial reconnaissance bonus, US $1,400 per 1,000 sq. mi. **Annual Prospecting Rental:** 70¢ per sq. mi. during regular term; $1.40 during extension. **Royalty:** 12½% of sale value. **Drilling Obligation:** Geol. surveys on- and offshore; "reasonable" drilling to prove production, using 10,000 ft. rig. Time limit not specified.

**EXPLOITATION: Conversion:** Guaranteed. **Duration:** 30 yrs., renew up to another 30. **Area:** Max. each lease, 64,000 acres. **Surrender:** Free on 12 months' notice for complete lease surrender; 6 months for part or parts. **Taxes:** Annual rental from 14¢ per acre for 1st yr. up to 84¢ beginning 10th. **Royalty:** 12½% of sale value refining. **Obligation:** Upon aggregate yearly production of 1,750,000 bbl., govt. many require refinery completion in 2 yrs. for 50% of crude output. **Income Tax:** None. **Dividend Tax:** None.

*Taken from *World Petroleum Legislation*, 604 Fifth Ave., N. Y. 20, N. Y. (see p. 37-38)

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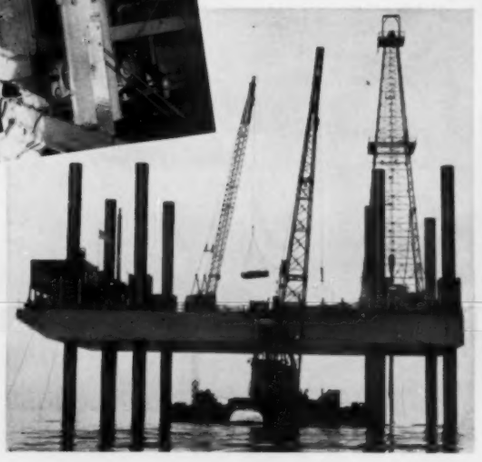

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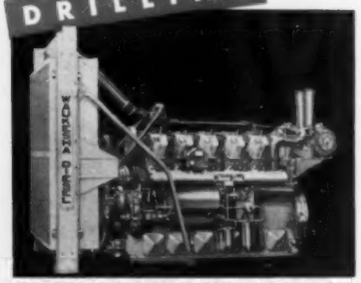
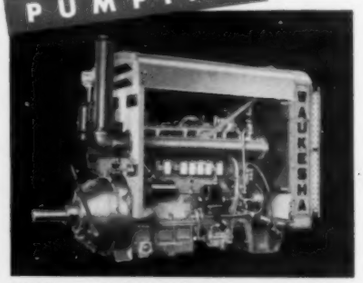
**DRILLING**



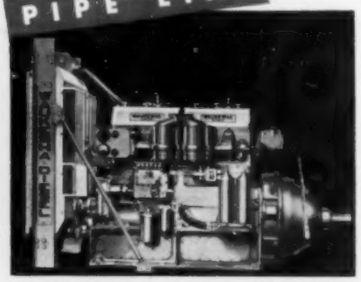
**VLRDBSU Turbocharged Diesel Unit**—twelve cyl., 8½-in. bore x 8½-in. stroke, 5788 cu. in. displacement, 1190 hp at 1200 rpm.

**PUMPING**



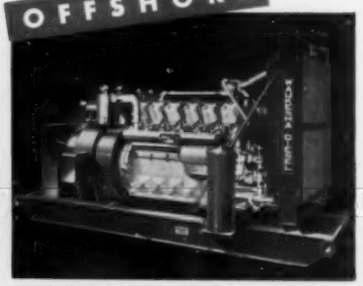
**WAKU Special Long Life Unit**—six cyl., 6¼-in. bore x 6½-in. stroke, 1197 cu. in., 125 continuous (65%) hp at 1200 rpm.

**PIPE LINE**



**NKDBU Normal Diesel Power Unit**—six cyl., 7-in. bore x 8¼-in. stroke, 1905 cu. in., 270 hp at 1200 rpm, (to 360 hp turbocharged).

**OFFSHORE**



**VLRD Series Diesel Enginator**—twelve cyl., 8½-in. x 8½-in., 5788 cu. in. engine direct connected to heavy duty AC Alternator—up to 800 KW.

# GUATEMALA

## PHYSICAL DEVELOPMENT

**Exploration:** Guatemala is in the midst of an exploration boom which is now going into its second stage. The first round of 38 permits was granted late in 1956 and early in 1957; and the second round began during August 1957, when a concession over 380,000 acres in western Peten was granted to Angel Martinez Franco, backed by Esso Standard.

An exploratory well was spudded by Coastal Plains Oil Co., formerly Sloane Exploration Co., at Bananera, on the Morales concession about 35 miles southwest of Puerto Barrios—using a slim-hole 7,000-ft. rig. Two more wells are planned near Puerto Barrios, and others at San Felipe and El Estor. Standard of California will drill near Livingston soon. Ohio Oil plans a well at La Arruga Grande, near the Mexican border, and is moving in equipment. Continental Oil Co. will drill near Lake Flores.

The areas being drilled are the more accessible ones. The interior regions of the Peten, where most concessions are found, is very difficult to move equipment into. Operations there will not get under way until late in 1958.

All applications filed prior to November 25, 1955, were considered on a basis of equal priority—which gave rise to many overlap problems. The companies solved this by taking percentages in one another's concessions and by trading. The second group of applications filed after November 25, 1955, is under consideration on a priority basis in order of filing, and should have fewer overlap problems.

**Production, Refining, Marketing:** There is neither production nor refining at present. Breaux Bridge Oil Refining Co., Breaux Bridge, La., has applied for a permit to construct a 2,000 b/d refinery at Santo Tomas. Story J. Sloan, exploration concessionaire, also applied for a refining permit, but reportedly has given up the idea for lack of capital. The Breaux plant would operate on Venezuelan crude and supply about one-third Guatemala's requirements. The company plans to dismantle a 1,600 b/d plant near Lafayette, La., and ship it to Santo Tomas. A Unifiner of about 1,200 b/d capacity would be included, and a 650 b/d Platformer.

Marketing needs in Guatemala are small—estimated at about 8,000 b/d during 1957. By special order of March 28, the price of gasoline and kerosine was fixed, and further price increases prohibited without specific approval from the Minister of Economy.

## OIL LAWS

The oil law passed under President Castillo is being respected by his successor, President L. Arturo Gonzalez, and no important changes have been made since it was covered in detail in *World Petroleum Report 1957*. Accompanying this article is a summary of the law.

## NATIONAL FACTORS

Following the assassination of President Castillo on July 26, 1957, President Gonzalez assumed control and pledged continuance of the Castillo policies. The attitude of the government continues to be friendly to foreign capital investment. The quetzal, unit of currency, remains unchanged—exactly equivalent to the US dollar. There has been no change in income tax rates, which are still a maximum 43% on income of $300,000 or over. Expenditures by the oil companies reached about $15 million in 1957, and are expected to be about double that amount in 1958. A total of $32 million was invested by 27 USA firms during 1954, 1955, 1956, and the first three-quarters of 1957. Most was by oil companies, but also included are United Shoe Machinery, George S. May Co., and Standard Fruit Co.

Governmental fiscal policies are generally conservative. Income by the government has risen sharply—from about $12.4 million in 1939 to $81.9 million in 1956. END

## Oil Law Summary★

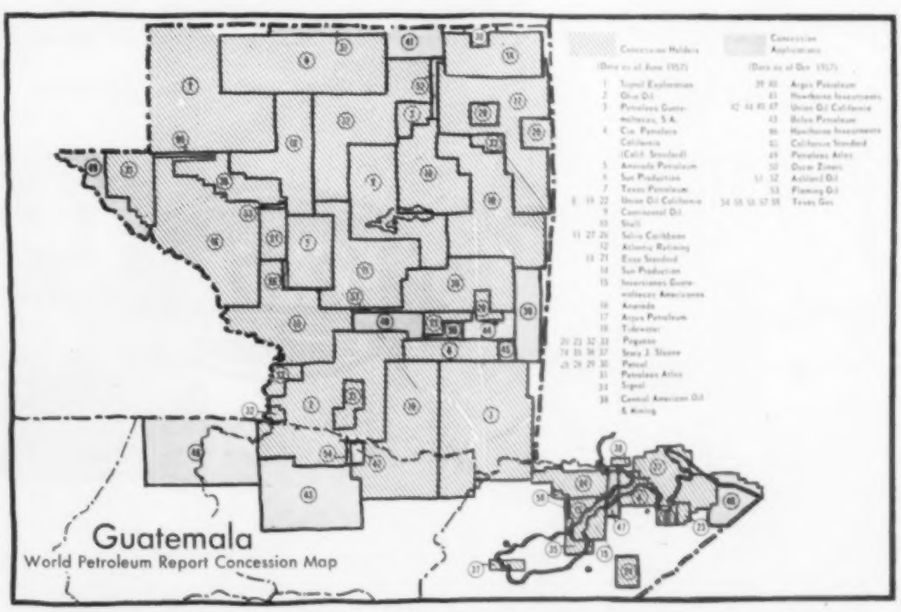
**EXPLORATION: Duration:** 6 yrs., with two 2-yr. extensions possible. **Area:** Max. per concession one million acres; max. per concessionaire same. **Ownership:** Except for marketing, oil industry a public utility; but foreign citizens may participate in petroleum rights. Concessions which revert to State become "national" reserves, subject to competitive bidding in which Guatemalans have preference. **Surrender:** On 30 days' notice. **Transfer:** Not permitted for 10 yrs. unless production encountered. **Bond:** $10,000 bond for surface reconnaissance permit. **Min. Annual Investment:** US 36¢ per acre during 1st 3 yrs. up to 16¢ during 7th and subsequent. **Annual Surface Tax:** 30 centavos per hectare (12 US cents per acre) 1st 3 yrs. up to 60 centavos (24 US cents per acre) 7th and subsequent yrs.—reducible 75% if min. financial commitment was met. **Drilling Obligation:** Work to begin within 90 days. **Conversion:** 5% or less of exploration area may be converted to exploitation any time. Oil discovery guarantees complete conversion.

**EXPLOITATION: Duration:** 40 yrs., with extension for 20 more possible. **Area:** Max. per concn., 62,500 acres. If less than ½ exploration area converted, remainder may be retained as exploration concn. subject to exploitation regulations. Number exploitation concns. per concessionaire, 10—for max. 500,000 acres. Total number exploration plus exploitation not to exceed 15—for max. 1,250,000 acres. **Annual Surface Tax:** Quetzales per hectare 1.50 (60 US cents per acre) 1st through 5th yrs.; rising to 4.50 (US $1.80 per acre) following 15th year. "Expenditures on same area are deductible up to 50% of surface tax." **Royalty:** 12½% of crude value—4% payable to surface owner. **Drilling Obligation:** Drilling to begin within 6 mos. unless production already found; must continue with "due diligence." Upon oil discovery, production must begin within 3 yrs. and not halted for more than 3 yrs. **Income Tax:** Up to 50% of net. **Depletion:** 27% gross after royalty, up to 50% of net before depletion.

★Taken from *World Petroleum Legislation*, 604 Fifth Ave., N. Y. 20, N. Y. (see p's 37-38)

**GUATEMALAN OIL CONCESSIONS IN FORCE**
**NOVEMBER 1957**

| Concessionaire | Acres |
|---|---|
| Signal Oil & Gas Co. | 671,114 |
| The Ohio Oil Co. | 665,467 |
| Petroleos Guatemaltecos SA | 58,498 |
| Standard Oil Co. of California | 67,142 |
| Amerada Petroleum Corp. | 218,849 |
| Sun Oil Co. | 592,887 |
| The Texas Co. | 743,852 |
| Union Oil Co. of California | 145,833 |
| Continental Oil Co. | 393,981 |
| Petroleum Investments (Overseas) Ltd. (Shell) | 482,789 |
| The Standard Oil Co. (Ohio) | 383,237 |
| The Atlantic Refining Co. | 472,475 |
| Standard Oil Co. (New Jersey) | 304,321 |
| Sun Oil Co. | 261,054 |
| Inversiones Guatemaltecas Americanas SA | 92,813 |
| Amerada Petroleum Corp. | 584,599 |
| Jaime Allan Willard Duran | 480,431 |
| Tide Water Associated Oil Co. | 310,975 |
| Union Oil Co. of California | 534,942 |
| Petroleos Guatemaltecos SA | 316,975 |
| Standard Oil Co. (New Jersey) | 61,493 |
| Union Oil Co. of California | 32,573 |
| Petroleos Guatemaltecos SA | 12,533 |
| Story J. Sloane | 47,119 |
| Standard Oil Co. of California | 55,498 |
| Standard Oil Co. of California | 160,004 |
| Standard Oil Co. (Ohio) | 211,105 |
| Standard Oil Co. (Ohio) | 34,156 |
| Standard Oil Co. of California | 39,412 |
| Standard Oil Co. of California | 21,072 |
| Petroleos Atlas de Guatemala | 241,992 |
| Petroleos Guatemaltecos SA | 39,207 |
| Petroleos Guatemaltecos SA | 43,969 |
| Signal Oil & Gas Co. | 102,764 |
| Story J. Sloane | 30,536 |
| Story J. Sloane | 20,027 |
| Story J. Sloane | 22,847 |
| Central American Oil & Mining Co. | 12,369 |
| Standard Oil Co. (New Jersey) | 382,617 |
| Total | 9,353,527 |



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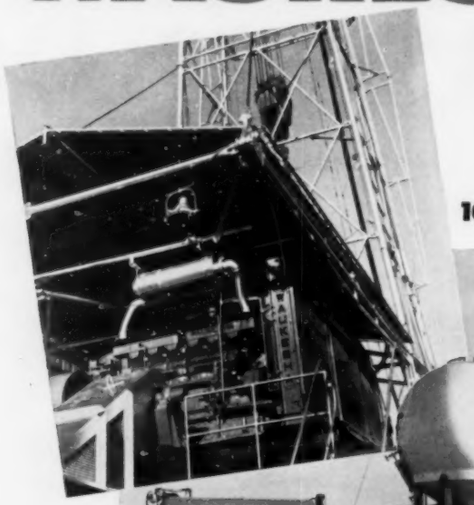
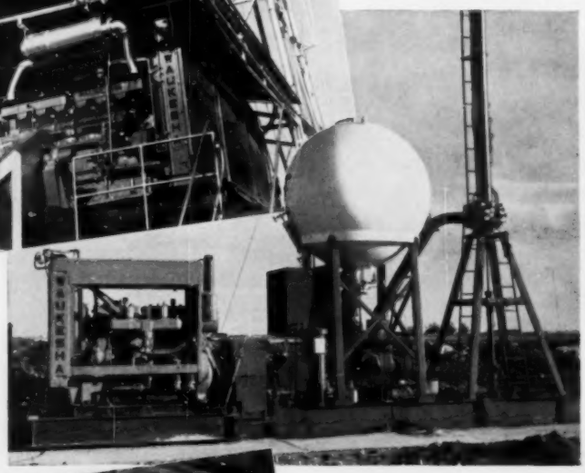
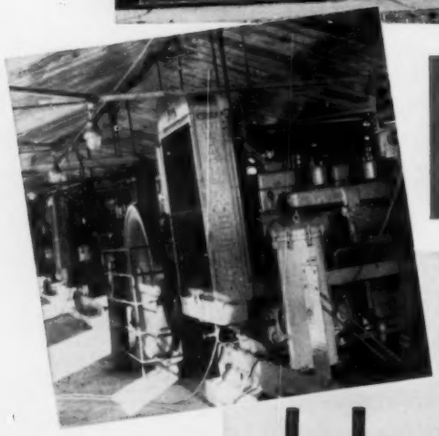
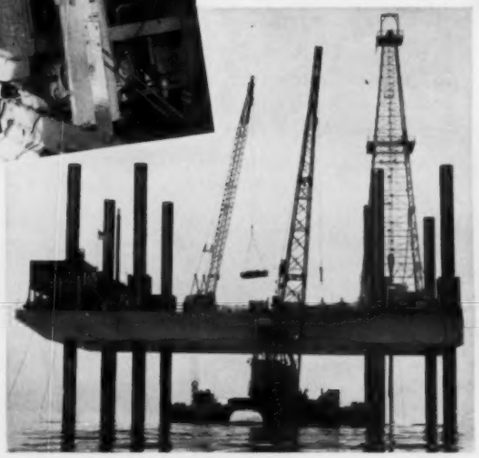






**WAUKESHA**
**MOTOR COMPANY**
WAUKESHA, WISCONSIN
New York • Tulsa
Los Angeles



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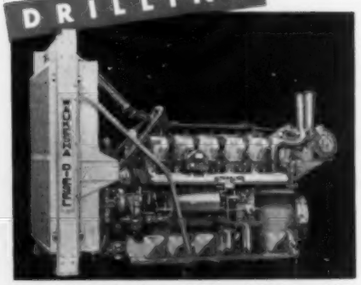
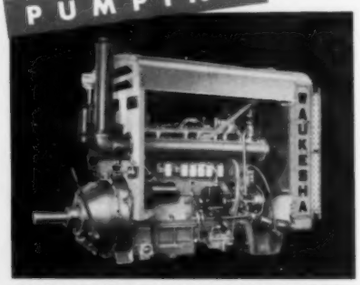
**DRILLING**



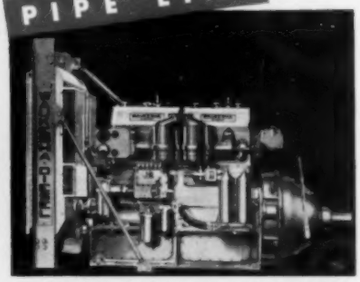
**VLRDBSU Turbocharged Diesel Unit**—twelve cyl., 8½-in. bore x 8½-in. stroke, 5788 cu. in. displacement, 1190 hp at 1200 rpm.

**PUMPING**



**WAKU Special Long Life Unit**—six cyl., 6¼-in. bore x 6½-in. stroke, 1197 cu. in., 125 continuous (65%) hp at 1200 rpm.

**PIPE LINE**



**NKDBU Normal Diesel Power Unit**—six cyl., 7-in. bore x 8¼-in. stroke, 1905 cu. in., 270 hp at 1200 rpm, (to 360 hp turbocharged).

**OFFSHORE**

**VLRD Series Diesel Enginator**—twelve cyl., 8½-in. x 8½-in., 5788 cu. in. engine direct connected to heavy duty AC Alternator—up to 800 KW.

# GUATEMALA

### PHYSICAL DEVELOPMENT

**Exploration:** Guatemala is in the midst of an exploration boom which is now going into its second stage. The first round of 38 permits was granted late in 1956 and early in 1957; and the second round began during August 1957, when a concession over 380,000 acres in western Peten was granted to Angel Martinez Franco, backed by Esso Standard.

An exploratory well was spudded by Coastal Plains Oil Co., formerly Sloane Exploration Co., at Bananera, on the Morales concession about 35 miles southwest of Puerto Barrios—using a slim-hole 7,000-ft. rig. Two more wells are planned near Puerto Barrios, and others at San Felipe and El Estor. Standard of California will drill near Livingston soon. Ohio Oil plans a well at La Arruga Grande, near the Mexican border, and is moving in equipment. Continental Oil Co. will drill near Lake Flores.

The areas being drilled are the more accessible ones. The interior regions of the Peten, where most concessions are found, is very difficult to move equipment into. Operations there will not get under way until late in 1958.

All applications filed prior to November 25, 1955, were considered on a basis of equal priority—which gave rise to many overlap problems. The companies solved this by taking percentages in one another's concessions and by trading. The second group of applications filed after November 25, 1955, is under consideration on a priority basis in order of filing, and should have fewer overlap problems.

**Production, Refining, Marketing:** There is neither production nor refining at present. Breaux Bridge Oil Refining Co., Breaux Bridge, La., has applied for a permit to construct a 2,000 b/d refinery at Santo Tomas. Story J. Sloan, exploration concessionaire, also applied for a refining permit, but reportedly has given up the idea for lack of capital. The Breaux plant would operate on Venezuelan crude and supply about one-third Guatemala's requirements. The company plans to dismantle a 1,600 b/d plant near Lafayette, La., and ship it to Santo Tomas. A Unifiner of about 1,200 b/d capacity would be included, and a 650 b/d Platformer.

Marketing needs in Guatemala are small—estimated at about 8,000 b/d during 1957. By special order of March 28, the price of gasoline and kerosine was fixed, and further price increases prohibited without specific approval from the Minister of Economy.

### OIL LAWS

The oil law passed under President Castillo is being respected by his successor, President L. Arturo Gonzalez, and no important changes have been made since it was covered in detail in *World Petroleum Report 1957*. Accompanying this article is a summary of the law.

### NATIONAL FACTORS

Following the assassination of President Castillo on July 26, 1957, President Gonzalez assumed control and pledged continuance of the Castillo policies. The attitude of the government continues to be friendly to foreign capital investment. The quetzal, unit of currency, remains unchanged—exactly equivalent to the US dollar. There has been no change in income tax rates, which are still a maximum 43% on income of $300,000 or over. Expenditures by the oil companies reached about $15 million in 1957, and are expected to be about double that amount in 1958. A total of $32 million was invested by 27 USA firms during 1954, 1955, 1956, and the first three-quarters of 1957. Most was by oil companies, but also included are United Shoe Machinery, George S. May Co., and Standard Fruit Co.

Governmental fiscal policies are generally conservative. Income by the government has risen sharply—from about $12.4 million in 1939 to $81.9 million in 1956. END

## Oil Law Summary★

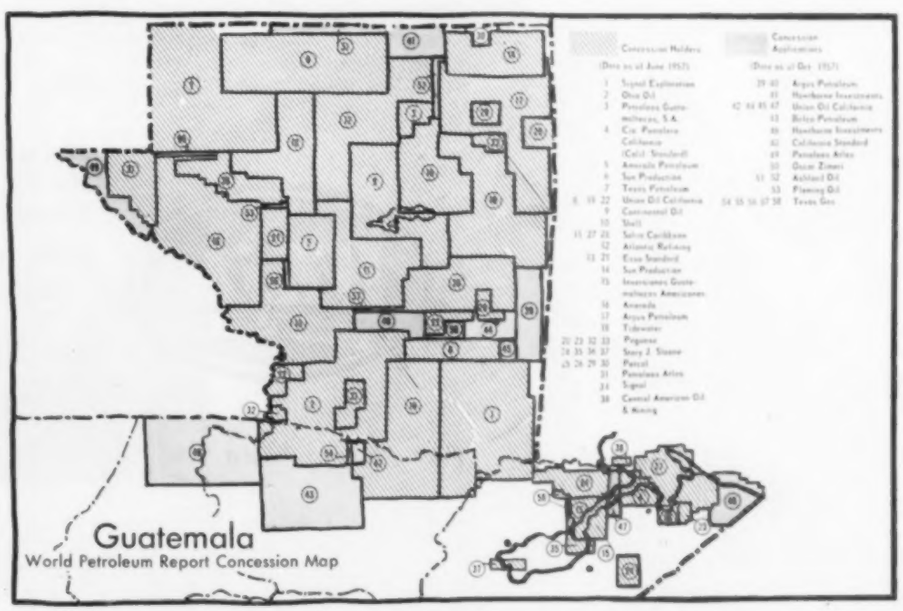
**EXPLORATION: Duration:** 6 yrs., with two 2-yr. extensions possible. **Area:** Max. per concession one million acres; max. per concessionaire same. **Ownership:** Except for marketing, oil industry a public utility; but foreign citizens may participate in petroleum rights. Concessions which revert to State become "national" reserves, subject to competitive bidding in which Guatemalans have preference. **Surrender:** On 30 days' notice. **Transfer:** Not permitted for 10 yrs. unless production encountered. **Bond:** $10,000 bond for surface reconnaissance permit. **Min. Annual Investment:** US 36¢ per acre during 1st 3 yrs. up to 16¢ during 7th and subsequent. **Annual Surface Tax:** 30 centavos per hectare (12 US cents per acre) 1st 3 yrs. up to 60 centavos (24 US cents per acre) 7th and subsequent yrs.—reducible 75% if min. financial commitment was met. **Drilling Obligation:** Work to begin within 90 days. **Conversion:** 5% or less of exploration area may be converted to exploitation any time. Oil discovery guarantees complete conversion.

**EXPLOITATION: Duration:** 40 yrs., with extension for 20 more possible. **Area:** Max. per concn., 62,500 acres. If less than ½ exploration area converted, remainder may be retained as exploration concn. subject to exploitation regulations. Number exploitation concns. per concessionaire, 10—for max. 500,000 acres. Total number exploration plus exploitation not to exceed 15—for max. 1,250,000 acres. **Annual Surface Tax:** Quetzales per hectare 1.50 (60 US cents per acre) 1st through 5th yrs.; rising to 4.50 (US $1.80 per acre) following 15th year. "Expenditures on same area are deductible up to 50% of surface tax." **Royalty:** 12½% of crude value—4% payable to surface owner. **Drilling Obligation:** Drilling to begin within 6 mos. unless production already found; must continue with "due diligence." Upon oil discovery, production must begin within 3 yrs. and not halted for more than 3 yrs. **Income Tax:** Up to 50% of net. **Depletion:** 27% gross after royalty, up to 50% of net before depletion.

★Taken from *World Petroleum Legislation*, 604 Fifth Ave., N. Y. 20, N. Y. (see p's 37-38)

### GUATEMALAN OIL CONCESSIONS IN FORCE NOVEMBER 1957

| Concessionaire | Acres |
|---|---|
| Signal Oil & Gas Co. | 671,114 |
| The Ohio Oil Co. | 665,467 |
| Petroleos Guatemaltecos SA | 58,498 |
| Standard Oil Co. of California | 67,142 |
| Amerada Petroleum Corp. | 218,849 |
| Sun Oil Co. | 592,887 |
| The Texas Co. | 743,852 |
| Union Oil Co. of California | 145,833 |
| Continental Oil Co. | 393,981 |
| Petroleum Investments (Overseas) Ltd. (Shell) | 482,789 |
| The Standard Oil Co. (Ohio) | 383,237 |
| The Atlantic Refining Co. | 472,475 |
| Standard Oil Co. (New Jersey) | 304,321 |
| Sun Oil Co. | 261,054 |
| Inversiones Guatemaltecas Americanas SA | 92,813 |
| Amerada Petroleum Corp. | 584,599 |
| Jaime Allan Willard Duran | 480,431 |
| Tide Water Associated Oil Co. | 310,975 |
| Union Oil Co. of California | 534,942 |
| Petroleos Guatemaltecos SA | 316,975 |
| Standard Oil Co. (New Jersey) | 61,493 |
| Union Oil Co. of California | 32,573 |
| Petroleos Guatemaltecos SA | 12,533 |
| Story J. Sloane | 47,119 |
| Standard Oil Co. of California | 55,498 |
| Standard Oil Co. of California | 160,004 |
| Standard Oil Co. (Ohio) | 211,105 |
| Standard Oil Co. (Ohio) | 34,156 |
| Standard Oil Co. of California | 39,412 |
| Standard Oil Co. of California | 21,072 |
| Petroleos Atlas de Guatemala | 241,992 |
| Petroleos Guatemaltecos SA | 39,207 |
| Petroleos Guatemaltecos SA | 43,969 |
| Signal Oil & Gas Co. | 102,764 |
| Story J. Sloane | 30,536 |
| Story J. Sloane | 20,027 |
| Story J. Sloane | 22,847 |
| Central American Oil & Mining Co. | 12,369 |
| Standard Oil Co. (New Jersey) | 382,617 |
| Total | 9,353,527 |



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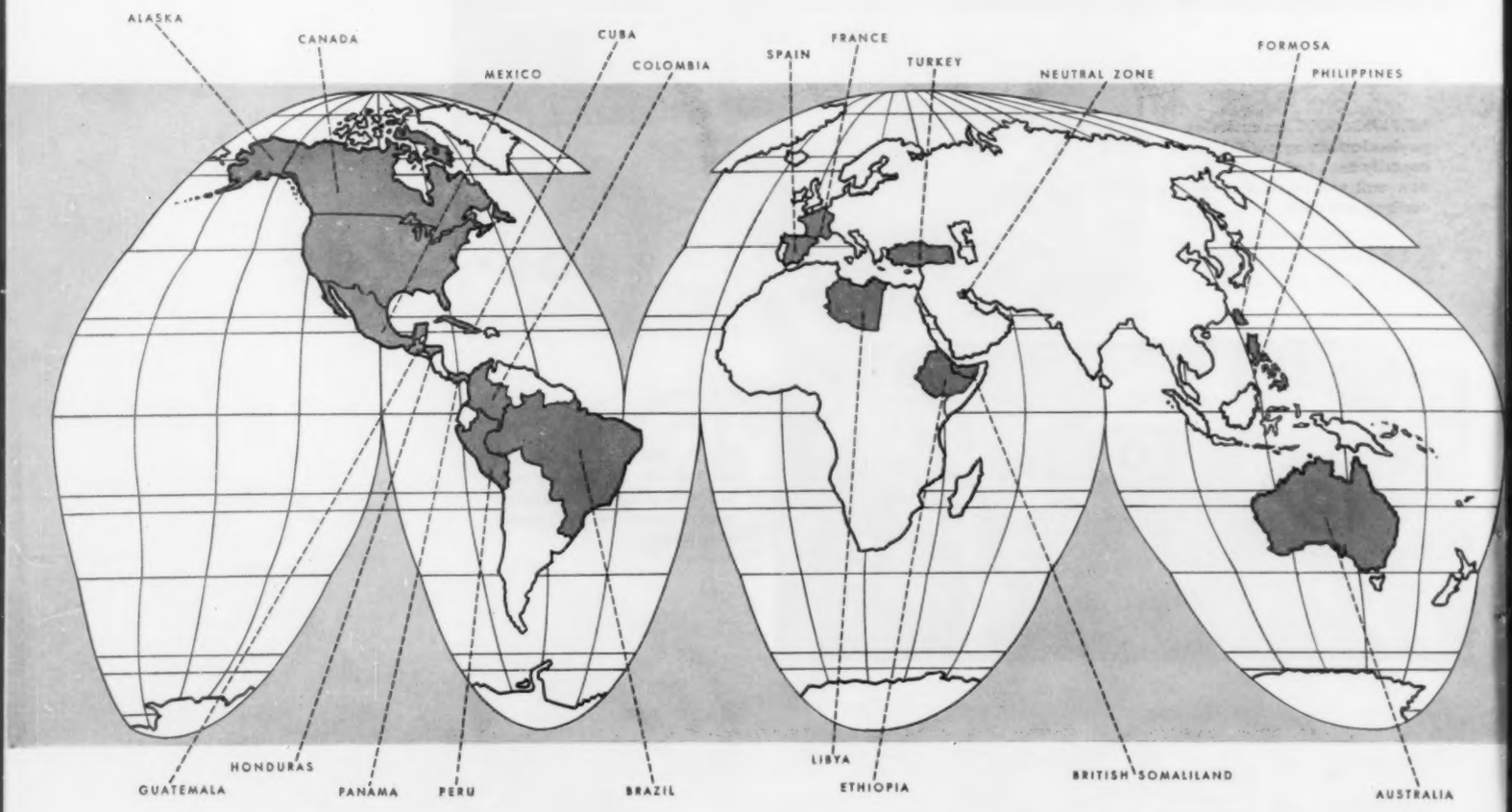


# PANAMA

### PHYSICAL DEVELOPMENT

Yorkin 1, a wildcat by Union Oil Co. of California, was dry at 5,500 ft. early in 1957, and abandoned. It was located opposite the company's Costa Rican well, Cocoles 1. No other deep tests were drilled in 1957.

Champlin Oil and Refining, operator for a group including Kerr-McGee Oil Industries Inc. and Southland Royalty Co., will drill two wildcats during early 1958 offshore in Laguna de Chiriqui.

Other concessionaires include Eastern States Petroleum & Chemical Corp. (not on map), which has 1,500,000 acres; Tradewinds Exploration Co. (subsidiary of McRae Oil & Gas Corp.); Delhi-Taylor Oil Corp.; and International Oil & Metals Corp. (a combination of mining interests from the USA Pacific Northwest). Tradewinds plans a deep test during 1958, and Delhi-Taylor is currently engaged in stratigraphic drilling—with a $1.6 million budget in the next 18 months and $5.5 million over the next five years.

United Fruit acquired 1,061,000 acres in 1957 from Time Petroleum Co. which, in turn, acquired it from Cia. Cataracta de Petroleo Panama, in exchange for $150,000 cash plus overriding royalty. Ball Associates have been retained as consultants. Cataract has also farmed out acreage to Columbus Texall Co., California independent, which will explore 850,000 acres for a 50% interest.

Previous exploration in Panama has been discouraging. Venezuelan Petroleum Co., owned by Sinclair and Cities Service, drilled three holes on Bocas del Toro—all dry. Gulf Oil Corp. drilled three wells; one (Garachine 1) had shows. Cities Service had previously drilled three dry shallow wells, deepest to 3,500 ft.

**Production—Refining:** Two 55,000 b/d refineries are planned—one by Panama Refining & Petrochemical Co. at Portobello Harbor—15 miles northeast of Colon, Atlantic side. Foster Wheeler will build it. Another is planned by a company headed by D. K. Ludwig, banker-owner from New York.

### NATIONAL FACTORS

No change of importance occurred in the national factors listed in *World Petroleum Report 1957*. There remains no exchange control. The balboa is on a par with the US dollar.

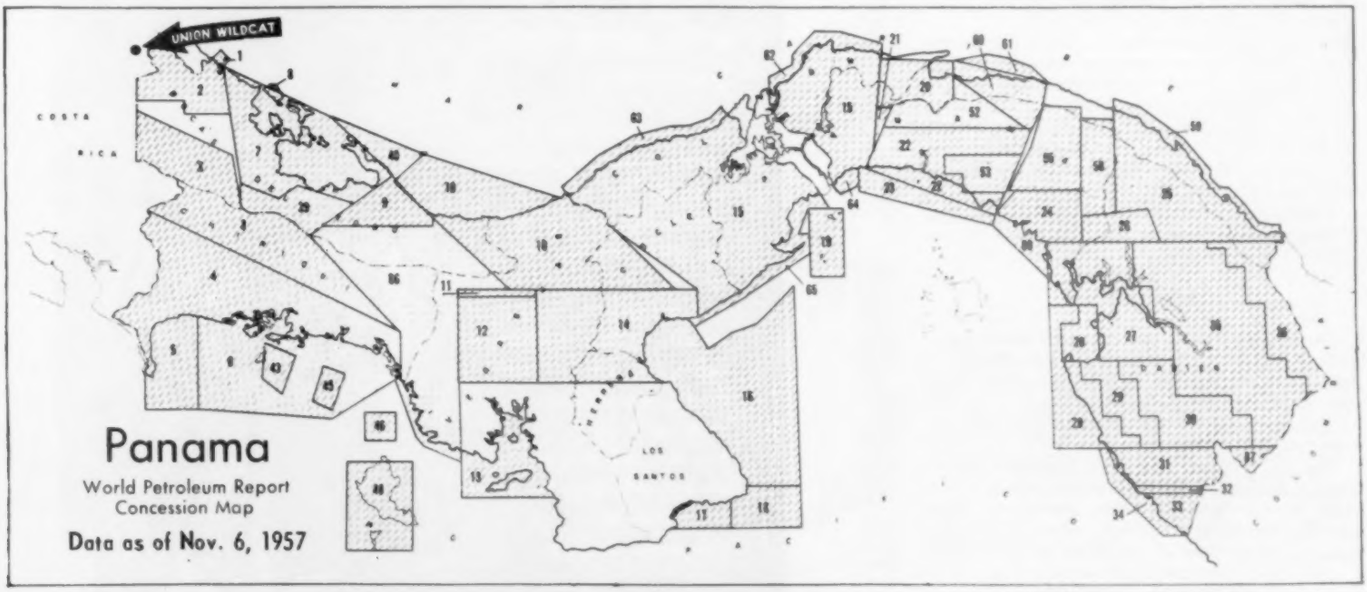
## Oil Law Summary★

*Subsoil property of the State.*

**EXPLORATION: Duration:** 3 yrs. Extensions not provided for. **Area:** 6,175 acres per concession. No limit per concessionaire. **Surface Tax:** None. **Work Obligation:** Must begin within 90 days. One well must be drilled within 3-yr. period of concession to 1,650 ft. or to production.

**EXPLOITATION:** Exploration concessionaire given rights to select any area within his exploration concession for exploitation concession. **Duration:** 20 yrs. Periodic renewals of 20 yrs. each given, subject to laws then in force. **Refining, Transportation, Marketing:** Exploitation concession conveys right to sell, transport, and refine production discovered. **Surrender:** Any time, in whole or in part. **Drilling Obligation:** 1,650 ft. within 5 yrs. on every 24,710 acres contracted. **Annual Surface Tax:** 6¢ per acre in concessions up to 125,000 acres. 4¢ per acre over 125,000. **Royalty:** 16 2/3% on gross production. **Import and Export Duties:** Concessionaire exempt.

★Taken from *World Petroleum Legislation*, 604 Fifth Ave., N. Y. 20, N. Y. (see p's 37-38)




| Area | Concessionaire |
|---|---|
| 1,8,10 | Jeronimo A. Neira. Transferred to Tradewinds Exploration of Panama, S.A. |
| 2, | Union Oil Co. of California |
| 3 | Corporation Hemisferica de Gas y Petroleo |
| 4 | Cia. "La Cruz S.A." |
| 5 | Ricardo M. Lasso |
| 6 | Juan de Dios Poveda. Transferred to Panama Oil R.F.O. |
| 7 | Champlin Oil and Refining Co. |
| 9,25,33,37 | Sossa Petroleum S.A. |
| 11 | Francisco Martinelli, Jr. |
| 12 | Roberto Lopez Fabega. Transferred to E. Raymond Moss |
| 13,17 | J.A. Sosa and Saturnino Flores |
| 14 | M.A. Jimenez and A. Arias. Transferred to Cia. Petrolera Istmena, S.A. |
| 15 | Exploraciones S.A. |
| 16 | Agustin Donderis. Transferred to Panama Oil R.F.O. |
| 18 | Esteban Ruiz O. |
| 19,23 | Felipe F. Barria. Transferred to Cia. Petrolera Taboga, S.A. |
| 20 | Agustin Donderis. Transferred to Panamerican Petroleum Corp. |
| 21 | F. Barragan |
| 22 | Cia. Petrolera |
| 24,56 | Jeronimo Almillategui |
| 26,55,58 | Jeronimo Almillategui, J.A. Sossa, S. Flores. |
| 27,28,30,36 | Cia. Petrolera Balboa, S.A. |
| 29,35 | Panamanian Delhi Petrolera Inc. |
| 31,32 | Jeronimo Almillategui. Transferred to Tradewinds Exploration of Panama, S.A. |
| 34 | Robt. D'Orsay |
| 38 | Formerly marked as Nelson Barragan. Now open. |
| 39,40 | Eduardo A. Chiari |
| 41,44,42,48 | Formerly marked as Robt. D'Orsay. Now open. |
| 49,51 | |
| 43,45,46,59 | Horacio Velarde |
| 47,50 | Formerly marked as Horacio Velarde. Now open. |
| 52,53 | Eduardo A. Chiari |
| 54,57 | Formerly marked F. Martinelli Jr. Now open. |
| 60,61,62,63 64,65,66 | Cia. Petrolera Taboga, S.A. |

# TRINIDAD

## PHYSICAL DEVELOPMENT

**Exploration:** An offshore depletion allowance, plus increased activity in the Gulf of Paria, have stimulated exploration in Trinidad's offshore area. Dominion Oil Ltd., a wholly owned subsidiary of Standard Oil Co. of California, is drilling a wildcat well offshore using a new floating technique. The wildcat, Couva Marine No. 1, is being drilled in 40 ft. of water, 4½ miles off the west coast of Trinidad, about 13 miles south of Port of Spain, north of Trinidad's offshore field, Soldado.

Offshore licenses form a belt south and west of the island, where Dominion Oil holds half a million acres, and some 448,000 acres are equally divided between Trinidad Northern Areas and Trinidad Development Co. Two small units are held by Antilles Petroleum and Kern Trinidad Oilfields.

Exploration slowed in Trinidad during 1957. During the first half of the year, nine exploratory wells (all dry) were completed, compared with 22 during 1956. Development wells were up slightly—to 140 during the first half, compared with 240 during all of 1956.

**Refining and Marketing:** Aggregate processing capacity of three main refineries operating in Trinidad (owned by The Trinidad Oil Co. Ltd., at Pointe-a-Pierre; Shell Trinidad Ltd., at Point Fortin; and Brighton Terminal Ltd., at Brighton) is 135,000 b/d. Total crude runs to stills in 1956 were 44.9 million barrels, or average 123,000 b/d.

Domestic consumption within Trinidad and Tobago was approximately 29,440 b/d during 1956; it is estimated at 30,360 b/d in 1957.

## OIL LAWS

No important changes occurred in oil legislation during 1957. The depletion allowance has not been extended to land operations, and the effect may have slowed exploratory effort in Trinidad and caused consolidation of holdings by big companies.

The government has been watching Venezuela's success with new concession grants; and, during January 1958, announced that changes would be made in Trinidad's oil laws, making them "similar" to those of Venezuela.

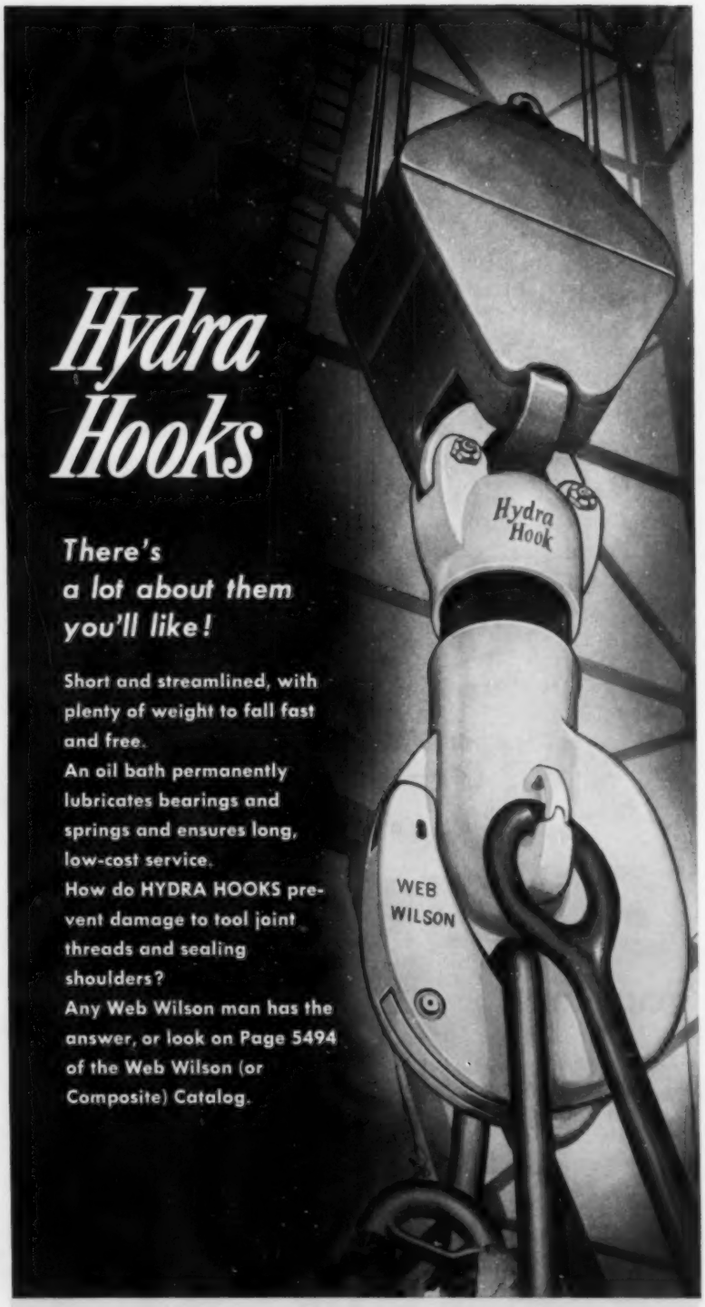
## NATIONAL FACTORS

No important changes occurred which adversely affect investment favorability in Trini-

**ERRATUM**

Trinidad Petroleum Development Co. Ltd. has no connection with Trinidad Northern Areas Ltd., as was erroneously stated in *World Petroleum Report 1957*.

The first offshore producer for Trinidad, drilled by Trinidad Northern Areas Ltd., had a production of 160 b/d. This is not above initial production from a Trinidad well as stated in *WPR-1957*—although initial production in Trinidad declined over a period to an average production per well of about 24 b/d.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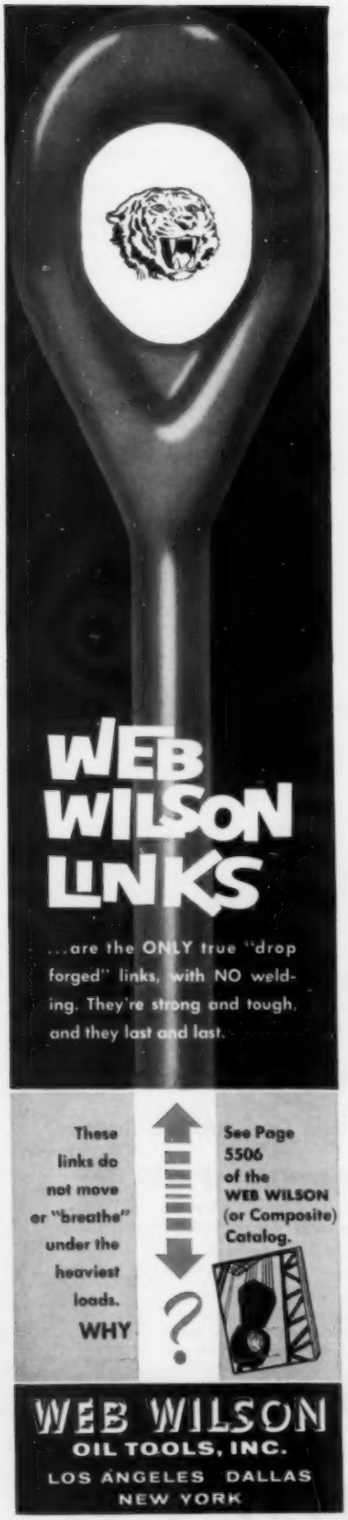
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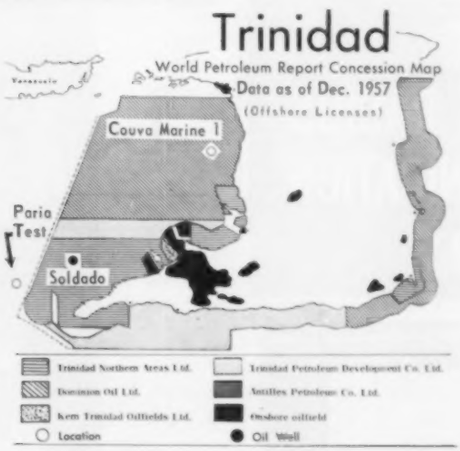
dad. Trinidad Oil Co. (formerly Trinidad Leaseholds) was purchased by The Texas Co. in 1956. During 1957, McColl-Frontenac Oil accepted an offer from The Texas Co. for the stock of Antilles Petroleum Co. (Trinidad) Ltd. Antilles Petroleum holds producing properties, leases, and concessions in Trinidad, BWI, and produced around 6,300 b/d by directional drilling offshore, in the Gulf of Paria in 1957. The Texas Co. holds an extensive interest (25%) in six new exploration blocks in the Gulf of Paria's Venezuelan side, acquired during 1957. Another company, Trinidad Petroleum Development Co., was purchased by British Petroleum Co. during 1957.

**TRINIDAD—WELL DATA**

| | 1957 | 1956 (End June) |
|---|---|---|
| Exploratory wells drilled: | 9 | 22 |
| Oil producers | — | 2 |
| Gas producers | — | 1 |
| Dry | 9 | 19 |
| Development wells drilled: | 140 | 240 |
| Oil producers | 131 | 223 |
| Gas producers | — | 2 |
| Dry | 9 | 15 |
| Total wells drilled | 149 | 262* |
| Footage drilled | 634,997 | 1,110,745 |
| Drilling rigs in service | 28** | 27** |
| Total wells drilled (cumulative) | 6,346x | 6,217 |
| Total oil producers end of year | 3,033x | 2,924 |
| Total gas producers end of year | — | — |
| Total wells pumping end of year | 1,662x | 1,638 |
| Total wells flowing end of year | 895x | 831 |

*23 wells drilling Dec. 31, 1956; 23 on 12/31/55; 20 on 12/31/46; 27 on 12/30/57.
**Average number.
xAt end June 1957.
**Source:** Petroleum Department, Trinidad.




## Oil Law Summary*

**EXPLORATION:** Government owns all subsoil rights following 1902. Private subsoil exists in titles acquired before that year. **Duration:** 2 Years. Extendible at governor's discretion. **Maximum Area:** 100,000 acres per concession. No limit per concessionaire. **Drilling:** Exploration gives right to geological and geophysical work, but does not include the right to drill deep tests. **Transfer:** Anytime, with government permission. **Work Requirement:** Must begin operations within three months. Must make regularly quarterly reports to government with maps. **Surface Tax:** Based on concession size. Annual tax rises from US $280 on 1,000 acres to US $3,500 on 100,000 acres. **Filing Fee:** US $2.92 per exploration license. Application fee of approximately US $14.

**EXPLOITATION:** Exploration concessionaire given right to one or more exploitation concessions over same area. **Duration:** 30 years. Extendible for 30 years at option of concessionaire. **Area:** May cover all of exploration area. **Surface Tax:** Rises from 56 US cents per acre during first year to US $2.10 during 6th year and each year thereafter. Rentals creditable against royalties paid same year. On extension of concession, rentals increased by 50%. On land actually occupied by concessionaire additional annual tax of approximately 14 US cents per acre payable. **Royalty:** 10% on production below 350,000 barrels yearly. Rises to 12½% on production onshore over 500,000 barrels yearly. Offshore royalty is 10% on production below 450,000 barrels yearly, rising to 12½% on production over 600,000 barrels. **Reciprocity:** Concession grantable only to companies whose home countries grant similar rights to British subjects. U. S. companies fulfill this requirement. **Company Structure:** Must have British representation on board, majority of British employees. **Refining Obligation:** Refinery to handle 50% of production must be built within two years when production passes limit to be specified in concession. **Offshore:** Special conditions apply. Exploration and exploitation merged in one license of 30 years duration with 30 years extension. Minimum 675 acres, no maximum. Includes right to drill exploratory wells. Surface rentals 5.8 US cents per acre during first year, rising to US $1.05 per acre during tenth year and thereafter. Rental payments deductible. **Depletion:** Given on offshore production only. Ranges from 10% of gross production during 1956-1960, to 15% during 1961-1965, and 20% during 1966-1982.

*Taken from *World Petroleum Legislation*, 604 Fifth Ave., N. Y. 20, N. Y. (see p's 37-38)

## REFINERIES IN TRINIDAD—1957

| *Name of Company* | *Plant Location* | *Crude Capacity* | *Type Plant* | *Cracking Capacity* |
|---|---|---|---|---|
| The Texas Co. | Brighton | 5,000 | S | — |
| Trinidad Oil Co. Ltd. | Point-a-Pierre [1] | 85,000 | SCA | 48,500TC |
| Shell Trinidad Ltd. | Point Fortin | 37,000 | Comp. | — |
| | Total | 127,000 | | 48,500TC |

[1] 36,000 b/d thermal cracking capacity and 22,500 b/d cat. cracking capacity. 8,000 b/d Platformer and 10,000 b/d hydrotreater under construction.
Capacities are in barrels per day. Key to type of plant: S—skimming; L—lubricating; A—asphalt; C—cracking; Comp.—complete. Under cracking capacity to indicate type: T—thermal; C—catalytic. All data as of December 1, 1957.

# NICARAGUA

The factors listed in *World Petroleum Report 1957* remain unchanged. Foreign capital enjoys the right of free entry and withdrawal, described in *WPR 1957*, and there has been no change in the rate of exchange. By Executive Decree of October 31, 1957, proceeds from all Nicaraguan exports (except coffee and cattle) will now be converted at the official buying rate of 7 cordobas per US dollar (14.28 US cents per cordoba) thus eliminating the former spread of 40 centavos per dollar. Income-tax rates, to which the petroleum industry is subject, remain at rates ranging from 4% to 18% on income over $141,800.

### PHYSICAL DEVELOPMENT

**Exploration:** The principal exploration concession, the Miguel d'Escoto-Joseph J. Coney holding, was taken over by Waterford Oil Co. —with 2/9 interest owned by Gulf, J. Ray McDermott Co., the driller (2/9), and 5/9 remaining to Waterford (see *WPR 1957*).

The first well, Touche No. 1, was spudded in February in 6 ft. of water, about 25 miles offshore and 45 miles northeast of Puerto Cabezas on the Atlantic coast. It was abandoned at 14,998 ft., with no shows; and the company reportedly plans five to seven more wells. This was the first offshore test. Two on-land wells were drilled by Gulf Oil Corp. near Punta Gorda in 1940-41, but hit granite at about 6,200 ft.

**Production, Refining, Marketing:** There is neither production nor refining. Marketing is estimated at 2,860 b/d during 1957.

### OIL LAWS

A new petroleum law, replacing the one summarized in *World Petroleum Report 1957*, was sent to the Chamber of Deputies, September 13, 1957, for consideration. Its dispositions are generally favorable, as shown in the accompanying summary. For a summary of the Miguel d'Escoto concession, see *World Petroleum Report 1957*.

### NATIONAL FACTORS

The political situation remained calm during 1957. The assassination of President Somoza in September 1956 had caused considerable speculation, and business activity dropped. His son, Luis Somoza, quickly ascended to the presidency, and the country has remained stable—with little change.

## Oil Law Summary★

Governing "Law On Hydrocarbons" (dated Nov. 29, 1933) gives only general requirements for petroleum concessions—including only designation of area, proof of financial and technical capacities, and performance of obligations. New draft petroleum law submitted to Congress Sept. 13, 1957. Its provisions follow: Subsoil belongs to nation. Country divided into 4 zones: Pacific, Central, Atlantic, and Continental Shelf.

**RECONNAISSANCE:** Freely done under special permit. No fees payable.

**EXPLORATION:** Duration: 3 years. Renewable for 3 years. **Area:** 370,500 acres in Pacific zone, 741,000 acres in Central, 494,000 acres in Atlantic, 741,000 acres on Continental Shelf (Pacific side)—988,000 acres (Atlantic side). Maximum per concessionaire, 3 times maximum concession area. **Bond:** 40 US cents per hectare in Pacific zone, 15 US cents Central, 30 US cents Atlantic, 25 US cents Continental Shelf. **Minimum Investment:** (US cents per acre): Pacific, 16; Central, 6; Atlantic, 12; Continental Shelf 10. **Annual Exploration Tax:** (US cents per acre): Pacific, 2; Central, 0.8; Atlantic, 16; Continental Shelf, 1.2. During extensions, rates raised 0.8 US cents per acre.

**EXPLOITATION:** Conversion guaranteed. If commercial discovery made, field area converted; remaining concession kept for exploration. Equivalent amount to exploitation area must be returned. If no discovery made, conversion may be done with return of 50% exploration area to govt. **Drilling Obligation:** 5,000 meters per 247,000 acres concession area during first seven years; 10,000 meters per 49,400 acres during following eight years. **Area:** Maximum 50% exploration area, selected by concessionaire. Maximum per concession, 61,750 acres. Maximum per conessionaire from 362,500 acres Pacific zone, to 1,500,000 acres Continental Shelf. **Duration:** 40 years. Extendible 20 years. **Initial Exploitation Tax:** Payable once: Pacific, 20 US cents per hectare; Central, 8; Atlantic; 12; Continental Shelf, 10. **Annual Surface Tax** (US cents per acre): From first year graduated up to 40th year: Pacific 6-20; Central, 2-20; Atlantic, 4-20; Continental Shelf, 4-20. **Royalty:** 11%. **Income Tax:** Subject to general tax (now at maximum 18%). **Depletion Allowance:** 27.5% gross, up to 50% of net. Maximum all payments to government, 50%.

**REFINING AND TRANSPORTATION:** 40-year concession granted to exploitation concessionaire on request. Must begin operations within one year. Must transport compatible oils belonging to third parties or government on request. Rates specified by government.

★Source: *World Petroleum Legislation*, 604 Fifth Ave., N. Y. 20, N. Y. (see p's 37-38)

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**World Petroleum Report**

**1957**

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a

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# SOUTH AMERICA

## PHYSICAL DEVELOPMENT

**Exploration:** Activity concentrated on upper South America during 1957, as Argentina, Brazil, Chile and Uruguay remained closed to private capital. Interest heightened in Paraguay and Bolivia—both newly opened to private capital—and in Peru, where a new strike in the Montana region gave first encouragement there. However, no deep sedimentary basin has yet been proved in Peru.

Ecuador also seems due for a more intense oil search. Recently, also, Surinam granted a concession to the Colmar Surinam Co., but oil prospects there seem remote, since a Jersey Standard wildcat many years ago encountered metamorphics at shallow depths.

Interest centered on Venezuela and Colombia, where new discoveries were made in 1957, and on the Gulf of Paria between Venezuela and Trinidad. A well in the Gulf (by Paria Operations) had oil shows during January.

**Production:** Total crude production in South America expanded by about 13% during 1957, to 3,103,700 b/d. Only Venezuela and Colombia showed large increases; the other producing countries remained about the same.

**Refining:** Increases in capacity occurred in Venezuela, Brazil, and Colombia. The area's total capacity expanded only slightly to 1,125,480 b/d crude capacity, with 300,000 b/d cracking.

**SOUTH AMERICA—CRUDE-OIL PRODUCTION AND RESERVES**

| | Production 1957 (Barrels Per Day) | Reserves (a) (Millions of Barrels) |
|---|---|---|
| Argentina | 91,800 | 2,300 |
| Bolivia | 9,800 | 70 |
| Brazil | 27,200 | 310 |
| Chile | 11,700 | 25 |
| Colombia | 121,600 | 650 |
| Ecuador | 8,700 | 25 |
| Peru | 52,700 | 275 |
| Venezuela | 2,780,200 | 14,000 |
| Totals | 3,103,700 | 17,655 |

a Estimated for each country as of the latest data available.

**REFINERIES AND CAPACITY—SOUTH AMERICA**

| Name of Country | Number of Plants | Crude Capacity (Barrels Daily) | Cracking Capacity (Barrels Daily) |
|---|---|---|---|
| Argentina | 16 | 216,670 | 113,340TC |
| Bolivia | 4 | 11,900 | — |
| Brazil | 8 | 111,800 | 16,400T |
| Chile | 4 | 20,360 | 16,000T |
| Colombia | 4 | 73,000 | 44,760TC |
| Ecuador | 2 | 5,650 | — |
| Peru | 3 | 46,000 | 14,500T |
| Uruguay | 1 | 28,000 | 7,000TC |
| Venezuela | 11 | 612,100 | 88,000T |
| Total South America | 53 | 1,125,480 | 300,000 |

Under cracking capacity to indicate type: T—Thermal. C—Catalytic.

**SOUTH AMERICA—ESTIMATED CONSUMPTION OF PETROLEUM**

(Crude-Equivalent Basis—Thousands of Barrels Per Day)

| Country | 1957 | % Change 1957 Over 1956 |
|---|---|---|
| Argentina | 255 | + 6.3 |
| Bolivia | 7 | +16.6 |
| Brazil | 229 | + 9.0 |
| Chile | 42 | + 5.0 |
| Colombia | 57 | + 7.5 |
| Ecuador | 8 | — |
| Peru | 43 | + 7.3 |
| Uruguay | 29 | + 3.6 |
| Venezuela | 158 | +11.3 |
| Others | 42 | + 5.0 |
| Total South America | 870 | + 8.0 |

**Marketing:** Consumption in South America during 1957 increased 8% over the previous year. The area's dependence on oil as an energy source is growing at a faster rate.

## OIL LAWS

New regulation was proposed during 1957 in Brazil and Chile—but not passed in either country. South America has converted oil regulation to conform to the more liberal pattern as exemplified in Venezuela—over the course of the post-World War II period. New laws were passed several years ago in Colombia (modifying the previous laws by addition of a depletion allowance, among other features); in Bolivia, where a complete new oil code replaced the previous restrictive legislation; and in Peru, where a new law soon increased activity there. Although more liberal legislation was not accepted in Brazil and Chile, recent exploration indicates that possibilities for a major strike in these areas may be remote (especially in Brazil).

## NATIONAL FACTORS

The attitude toward foreign private capital investment in oil has become more liberal in recent years, as shown by the trend toward more liberal oil legislation. The primary force behind this trend is the increase in energy use—the exchange needs for supplying oil imports have forced countries to search for supplies within their own borders.

**REFINERIES IN URUGUAY—1957**

| *Name of Company* | *Plant Location* | *Crude Capacity* | *Type Plant* | *Cracking Capacity* |
|---|---|---|---|---|
| Administracion Nacional de Combustibles, Alcohol y Portland (ANCAP) | Montevideo [1] | 28,000 | SCA | 7,000TC |

[1] 5,000 b/d catalytic cracking capacity and 3,000 thermal cracking capacity. Under construction: 28,000 b/d crude capacity increase. Catalytic cracker and asphalt capacity increased 750 b/d in 1957.

Capacity is to be doubled under new contract awarded late 1957 to M. W. Kellogg Co. Includes new 28,000 b/d atmospheric crude unit; 10,000 b/d vacuum unit; 5,000 b/d fresh-feed Orthoflow fluid catalytic cracker; 3,000 b/d Sinclair-Baker-Kellogg cat reformer; gasoline stabilization and gas-recovery unit; and 4,500 b/d gasoline treating unit.

Capacities are in barrels per day. Key to type of plant: S—skimming; A—asphalt; C—cracking. Under cracking capacity to indicate type: T—thermal; C—catalytic. All data as of December 1, 1957.

**URUGUAY—REFINING AND MARKETING**

(Thousands of Barrels)

| | Refinery Operations Est. Year 1957 | Consumption Est. Year 1957 | Imports Est. Year 1957 | Exports Est. Year 1957 |
|---|---|---|---|---|
| Crude | 8,030.0 | | 8,030.0 | |
| Avgas | 8.0 | 83.0 | 75.0 | — |
| Motor fuel | 2,176.1 | 2,212.0 | 100.0 | 1.0 |
| Kerosine | 1,236.6 | 1,195.0 | — | — |
| Gas oil and distillates* | 738.0 | 1,255.0 | 1,000.0 | — |
| Heavy fuel oil* | 3,653.7 | 3,714.0 | 1,000.0 | 50.0 |
| Lube oils and greases | — | 87.0 | 87.0 | — |
| Others | 40.1 | 80.0 | 40.0 | — |
| Losses, etc. | 176.7 | 180.0 | — | — |
| Total | | 8,806.0 | 10,332.0 | 51.0 |
| Bunkers: | | | | |
| Distillates | | 280.0 | | |
| Heavy fuel oil | | 1,275.0 | | |

*Excluding bunkers.

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# ARGENTINA

## PHYSICAL DEVELOPMENT

**Exploration:** Argentina continues to reserve exploration to the government, through its wholly owned company "Yacimientos Petroliferos Fiscales" (YPF). Not permitted to acquire additional exploration areas, output of the private oil companies has dwindled until virtually all production within Argentina now is by YPF.

YPF reportedly maintains 11 seismic parties, 3 gravity crews, and 7 surface geologic parties in the field. During June 1957, YPF announced discovery of a new oil field in southern Argentina, 38 miles west of the city of Comodoro Rivadavia and 11 miles from Pampa del Castillo field. Initial production of the discovery was 250 b/d from 4,260 ft.—with a 9-ft. pay thickness.

Early in 1957, YPF is reported to have discovered a well on a new structure at Las Ventanas, in the state of Mendoza, about 15 km south of Carrizal field, which came in for 540 b/d at 9,570 ft. Other Mendoza discoveries included new oil pools in Rio Tunuyan, south of Barrancas oil field, and in Estructura Itermedia, north of Tupungato. The latter well, EI-L, some three miles north of Tupungato field in the Cuyo area, reportedly flowed 1,700 b/d from 6,940 ft. to 6,960 ft., and was completed at 7,437 ft.

**ARGENTINA—EXPLORATION FIELD WORK IN 1956**

| | |
|---|---|
| Geological | 29 party-months |
| Gravity-magnetometer | 36 party-months |
| Reflection seismograph | 132 party-months |

YPF operated 56 rigs; drilled 51 exploratory wells—18 oil, 8 gas in 1956.

**ARGENTINA—SUMMARY OF YPF WELLS COMPLETED IN 1956**

| | Oil | Gas | Dry | Total | % Successful |
|---|---|---|---|---|---|
| Exploration | 18 | 8 | 25 | 51 | 51 |
| Development | 191 | 11 | 19 | 221 | 91 |
| Total | 209 | 19 | 44 | 272 | 84 |

In January 1958, three American companies were reported interested in oil development under a contract form with repayment by YPF in cash or oil. Companies were not named, but described as "important" by Argentina's ambassador to the USA.

During November 1957, YPF announced discovery of another new field in Mendoza, Punta de la Barda, 35 km from the city of Tunuyan and 15 km from La Ventanas field discovered earlier in the year. It produced 315 b/d from 2,255 to 2,275 meters.

A discovery also was reported in Chubut province, in Sarmiento (Anticlinal Grande); in Pampa del Castillo (Canadon Grande); and in Santa Cruz province, near Pico Truncado (Anticlinal Tres Lagunas). In Neuquen province, discoveries were reported in Sierra Barrosa and in El Sauce, north and south of Plaza Huincul and Challaco oil fields.

New wells drilled in the north considerably extended the Madrejones field, where more than 25 wells have been shut down awaiting oil and gas pipelines. Only two or three wells are flowing—sufficient to satisfy the small oil demand which may be transported by rail from Embarcacion to Formosa and from there to San Lorenzo refinery. According to Argentine sources, Madrejones is expected to produce its normal 63,000 b/d when facilities have been completed.

During October 1957, Laughlin Porter Co. (USA) received a YPF contract to drill 40 wells in Tierra del Fuego oil fields. These fields produce a light oil, accompanied by large gas production. YPF is seeking offers for the industrialization of such gas, either for carbon black or petrochemicals.

*Reserves:* The government estimates new discoveries have raised Argentine reserves to some 2,331 million barrels as of October 1957. Natural-gas reserves are estimated at 3.53 trillion cubic feet.

**Production:** YPF drilled 272 wells in 1956—including 51 exploration and 91 development successes—a slight rise over 1955. Footage drilled totaled 1,673,000 during 1956. Of this, Diadema drilled 105,363 ft.—with 26 well completions (15 oil, 11 dry). Production in 1957

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rose slightly—totaling 91,873 b/d in the first six months.

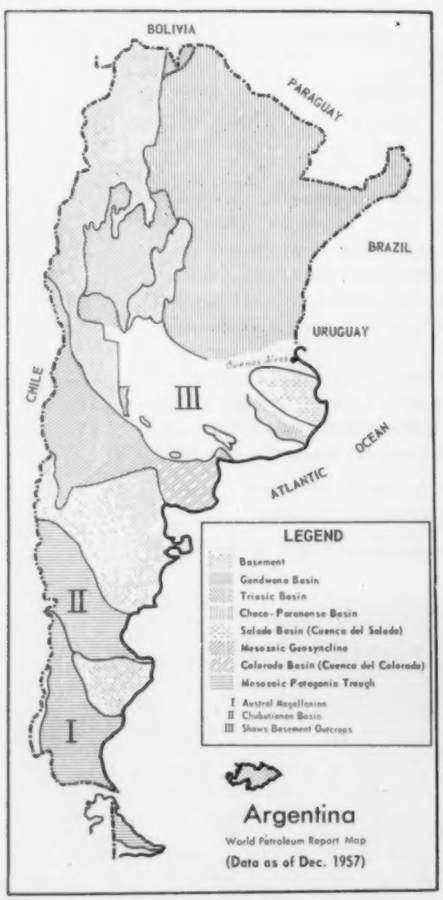
By YPF figures, of 3,300 producing wells in 1957, 100 were flowing. Average daily production per well was 25 bbl. During 1957, YPF received and put in operation in the Comodoro Rivadavia and Cañadon Seco fields 10 portable 6,000-ft. rigs, and plans to purchase 30 more of these rigs to replace obsolete equipment.

**Transportation:** Early in 1957, the Argentine government called for bids for extensive YPF construction work. With tenders opened April 5, 1957, many firms bid. Final winner for part of the contracts was Tecnica Industrial Petrolera SA (TIPSA), a local company in which Fish Engineering, North American Utility & Construction, and Clark Bros. are involved. The contract covers: (1) Tucuman-San Lorenzo crude pipeline; (2) a natural-gas system from the same field to Buenos Aires; (3) a separation plant for Campo Duran gas. Payment of one-fourth of the total $180 million is to be made in Argentine pesos; 60% in West European currencies; 15% in USA dollars. Terms call for payment of 25% the first year, 15% the second, 25% the third, 15% the fourth, 10% the fifth and 10% the sixth. Most of the equipment imports are to be from Western Europe. Crédit Lyonnais and other European bankers are handling the financing.

With construction scheduled to start in April 1958, completion should be within two years.

**ARGENTINA—CRUDE PRODUCTION**

| | 1957 (1st 9 Months) | 1956 |
|---|---|---|
| TOTAL | 91,746 b/d | 84,966 b/d |
| YPF | 78,782 b/d | 71,574 b/d |
| Other companies | 12,964 b/d | 13,392 b/d |
| **By Field (in cubic meters):** | | |
| Comodoro Rivadavia | 2,335,595 | 3,069,514 |
| YPF | 1,807,535 | 2,342,119 |
| Other Companies: | 528,060 | 727,395 |
| Diadema | 356,703 | 485,778 |
| Astra | 95,590 | 148,184 |
| Petroquimica | 75,767 | 93,433 |
| Plaza Huincul: | 484,455 | 707,932 |
| YPF | 470,963 | 688,822 |
| Esso | 13,492 | 19,110 |
| Northern Fields: | 92,242 | 81,368 |
| YPF | 71,581 | 51,376 |
| Esso | 20,661 | 29,992 |
| Mendoza: | 1,069,666 | 1,071,656 |
| YPF | 1,069,216 | 1,071,043 |
| El Sosneado | 450 | 613 |



**Refining:** Refining in 1957 remained at about the 1956 level. The National Power Board, in 1957, approved the proposed addition of a 47,000 b/d pipe still and a 17,000 b/d catalytic cracker at Esso's Campaña refinery. Most private oil companies in Argentina are confining refining budgets to keeping their refineries in safe running order. Changes in Argentina's constitution have complicated the situation. Following the Péron regime, the country returned to the 1853 constitution—as of mid-December under study at the National Convention in Santa Fe. With the majority favoring a State monopoly over power resources, supply, and marketing, the opposition minority decided not to attend the meeting—leaving the convention without the required quorum. In any case, until after the February 1958 presi-

**ARGENTINA—PRODUCTION AND DRILLING DATA (1957)**
**(YPF)**

| Name of Field | Year Discovered | Number of Wells Flowing 1957-1956 | | Number of Wells Pumping 1957-1956 | | Depth (Feet) | Producing Formation | API Gravity | Production (Barrels per Day) 1957 (1st 6 mos.) | 1956 | 1955 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| C. Rivadavia (Chubut) | 1907 | 79 | 83 | 2,034 | 1,943 | 3,400<br>6,906 | Upper<br>Cretaceous | 21.5—<br>24.2 | 42,343 | 40,363 | 37,406 |
| Santa Cruz | 1944 | | | | | 4,823—<br>6,562 | Upper<br>Cretaceous | 17.4<br>31.2 | | | |
| Mendoza | 1932 | 17 | 14 | 170 | 153 | 13,600 | Triassic | 29.3<br>31.4 | 24,430 | 18,455 | 17,618 |
| Neuquén | 1918 | Nil | Nil | 349 | 335 | 1,850<br>5,030 | Dogger<br>Malm | 29.3<br>31.2 | 10,622 | 11,869 | 14,228 |
| Salta (Campo Durán discovered 1952) | 1928 | 23 | 17 | 86 | 89 | 14,929 | Carboniferous | 45.4<br>49.9 [1] | 1,172 | 886 | 824 |
| Sarmiento (Chubut) | 1956 | — | 2 | 5 | — | 3,599 | U. Cretaceous | 30 | Not exploited | | |
| Tierra del Fuego | 1949 | 3 | 7 | Nil | | 7,139 | L. Cretaceous | 29.3 | Not exploited | | |
| | | | | | | | | | 78,567 | 71,573 | 70,076 |

Total footage drilled 1957 (estimated): 1,600,000 ft.
Total footage drilled 1956 1,568,791 ft.

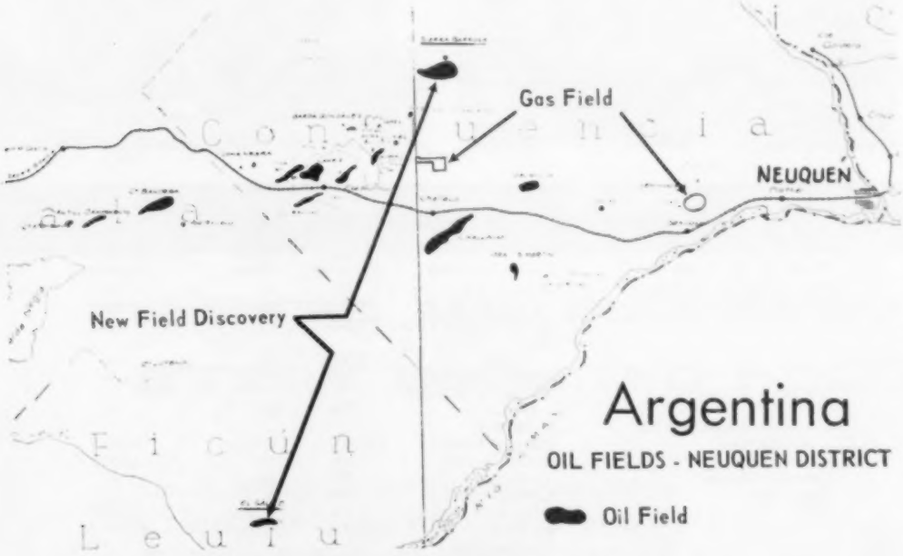
[1] Campo Durán and Madrejones—condensate field. Source: YPF.

**ARGENTINA OIL CONSUMPTION AND TRADE**
(Thousands of Metric Tons)

| | 1957 (Forecast) | 1956 | 1955 | % Change 1955-56 |
|---|---|---|---|---|
| Estimated Inland Consumption: | | | | |
| Motor gasoline | 1,750 | 1,650 | 1,690 | — 2.4 |
| Kerosine | 1,150 | 1,050 | 980 | + 7.1 |
| Gas-diesel oil | 1,900 | 1,800 | 1,930 | — 6.6 |
| Fuel oil | 6,800 | 6,100 | 5,550 | + 9.9 |
| Other | 700 | 700 | 510 | +37.3 |
| Total | 12,300 | 11,300 | 10,660 | + 6.0 |
| Per cent increase over previous year | 8.8 | 6.0 | 14.3 | |

dential elections, the companies hesitate to make substantial investments. M. W. Kellogg, Foster Wheeler, and Lummus tendered bids for the expansion planned by the government at Lujan de Cuyo refinery. Final allocation of the job awaits decision by the YPF board.

**Marketing:** Exports from Argentina are negligible. Imports of oil into the country have been rising steadily with increase of industrialization. Late in the year, the Argentine Finance Minister estimated 1957 oil imports would cost the equivalent of US $367 million, compared with US $250 million in 1956. During the first seven months of 1957, oil imports averaged 126,000 b/d for a total cost of US $200 million—about 66% more than in the comparable 1956 period. Cost of these oil imports absorbed about 42% of exchange resources accruing from export earnings from Argentina as a whole—amounting to $479.1 million converted at the official rate. This compares with 26% during the first seven months of 1956.




Domestic consumption averaged 246,000 b/d during 1957—about 6% over 1956. Fuel oils showed the highest rate of increase—followed by kerosine. Consumption of gas and diesel oils declined slightly, as did motor gasoline. Estimates of Argentina's future consumption place oil needs in 1965 at roughly 490,000 b/d. About half of this would have to be imported.

## OIL LAWS

Oil in Argentina is not the property of the nation, but of the province wherein the subsoil is located. Abrogated by the constitution put into effect during the Péron regime, these rights later were restored with Péron's overthrow and restoration of the 1853 constitution. YPF had held all exploration rights, outside of existing concessions, through agreement with the provinces. On change in administration, the provinces promptly suspended negotiations with YPF on oil reserves and royalties, and claimed a higher royalty than the 12% they had been receiving. (The state of Salta asked for 26% royalty.) They also demanded payment of royalty on refining runs, which YPF has not paid until now. On June 22, 1957, YPF signed a 10-year agreement, with option for renewal, with the new state of Santa Cruz. Under it, YPF pays that state an advance of three million pesos per year for exploration rights in Santa Cruz, plus a royalty of 12% on production, in cash or in crude.

The oil law of Argentina is quite restrictive, even without YPF's competition. Maximum exploration area per concession is about 5,000 acres, and only one may be given within a radius of three miles of an oil well previously in production—or a total of 150,000 acres within one Argentine petroleum district, Other unfavorable aspects of the law include duration of the exploitation concession, which is subject to negotiation; and the right of conversion of exploration rights to exploitation rights, which is not guaranteed.

## NATIONAL FACTORS

Rich in economic potential, Argentina is also geologically favorable for petroleum. Ten years of absolute rule by Péron left Argentina heavily in debt, its transportation system obsolete, and the country generally decapitalized. A report by the United Nations' Prebisch Commission, dated October 1955, states that investment of approximately 22 billion pesos would be required by the transportation industry alone—necessitating imports of 1.2 billion for machinery and equipment. An estimated 100 billion pesos for required highway improvement would be more than 50% of Argentina's national income—relatively much higher than the USA highway program.

Chronic inflation has retarded Argentina's progress. During the Péron regime, prices increased sixfold—compared with about 50% in the USA during a comparable period. Money supply appears to have increased seven or

**ARGENTINA—INTERNAL PRODUCT SALES**
(Cubic Meters)

| Product | 1956 | 1955 |
|---|---|---|
| Av. Gasoline | 103,889 | 78,401 |
| Motor Gasoline | 2,184,705 | 2,161,294 |
| Solvent | 59,114 | 57,328 |
| Aguarrás & Trementol | 29,316 | 28,494 |
| Kerosine | 1,060,305 | 941,221 |
| Jet Fuel | 6,669 | 5,184 |
| Agric. uses | 240,475 | 261,039 |
| Gas-Oil | 823,673 | 886,680 |
| Diesel-Oil | 1,210,572 | 891,164 |
| Fuel-Oil | 6,043,921 | 5,515,830 |
| Lube Oils | 189,930 | 165,803 |
| Baraffins | 41 | |
| Greases | 11,029 | 10,387 |
| Asphalts | 136,875 | 141,884 |
| Coke | 99,686 | 128,871 |
| Coke (metallurgic) | 23,799 | 28,785 |
| L. P. G. | 120,648 | 95,566 |
| Insecticides | 4,172 | 3,935 |
| Vaselines | 366 | 252 |

**ARGENTINA—CRUDE AND PRODUCT IMPORTS**
(Cubic Meters)

| | 1957 (estimated) | 1956 | 1955 |
|---|---|---|---|
| Crude | 6,607,000 | 4,744,859 | 4,621,398 |
| S. Arabia | | | 17,959 |
| Bolivia | | 80,981 | |
| Ecuador | | 127,904 | 149,092 |
| Iran | | | |
| Peru | | 88,524 | 85,122 |
| Venezuela | | 2,596,055 | 2,260,091 |
| Kuwait | | 1,798,678 | 1,888,920 |
| Colombia | | 52,717 | |
| USA | | | 37,307 |
| Russia | | | 68,848 |
| Br. Borneo | | | 37,595 |
| **Av. Gas** | 63,000 | 62,847 | 66,029 |
| USA | | | 10,817 |
| NWI | | 61,453 | 44,953 |
| BWI | | 1,394 | 4,109 |
| Russia | | | 6,150 |
| **Motor Gasoline** | | | |
| England | | | 19,980 |
| **Kerosine** | 135,000 | 132,745 | 210,626 |
| USA | | 75,263 | 167,967 |
| NWI | | 49,306 | 25,539 |
| Venezuela | | 8,176 | 17,120 |
| **Gas Oil** | 737,000* | 380,126 | 465,154 |
| Venezuela | | 37,876 | 149,142 |
| NWI | | 188,810 | 34,566 |
| USA | | 112,219 | 168,412 |
| Russia | | | 80,309 |
| Peru | | 41,221 | 32,725 |
| **Diesel Oil** | | 230,018 | 194,537 |
| USA | | | |
| Venezuela | | 58,363 | 21,917 |
| NWI | | 151,874 | 172,620 |
| Peru | | 19,781 | |
| **Fuel Oil** | | 3,479,683 | 2,713,915 |
| NWI | | 2,642,190 | 1,996,405 |
| BWI | | 117,466 | 19,708 |
| Russia | | 17,862 | 541,140 |
| Iran | | 50,967 | |
| U. K. | | | |
| Venezuela | | 614,170 | 155,747 |
| Mexico | | | |
| Bolivia | | 2,715 | 915 |
| USA | | 34,315 | |

*Includes diesel oil.

## ARGENTINA—ESTIMATED ENERGY AND CAPITAL NEEDS

(Figures in Thousands of Metric Tons Per Year—Partly Estimated)

| | 1955 | % | 1956 | % | 1960 | % | 1965 Minimum | % | 1965 Expected | % |
|---|---|---|---|---|---|---|---|---|---|---|
| Total Power Consumption As Equivalent Tons of Crude Oil Per Year | 15,843 | 100 | 16,655 | 100 | 21,300 | 100 | 27,500 | 100 | 30,000 | 100 |
| Petroleum and Natural Gas Equivalent | 11,951 | 75 | 12,801 | 72 [5] | 16,800 | 79 | 22,000 | 80 | 24,500 | 82 |
| Local Production Crude Oil and Natural Gas Equivalent | 4,905 [1] | 31 | 5,421 | 42 | 10,000 | 47 | 15,500 | 56 | 16,500 | 55 |
| Imports of Petroleum and Its Products | 6,906 | 44 | 8,206 [2] | | 6,800 | 32 | 6,500 | 24 | 8,000 | 27 |
| Reserves of Petroleum and Natural Gas Equivalent (Proved) [4] | 120,000 | | 175,000 [3] | | Estimated Mid. 1957 | | 260,000 | | | |

**Estimated Necessary Capital Expenditure**

In Millions of Pesos & Dollars

| | 1956 Dollars | 1960 Arg. Pesos | 1960 Dol. | 1960 Arg. Pes. | 1965 Dol. | 1965 Arg. Pes. |
|---|---|---|---|---|---|---|
| Increasing Local Crude Oil Production | 319 | 5,000 | 346 | 5,000 | 410 | 6,500 |
| Maintaining Local Crude Oil Production [5] | 187 | | 318 | | 330 | |
| Refining, Transportation, Distribution and Marketing | 170 | 2,800 | 177 | 2,900 | 262 | 4,300 |
| Crude Oil to Be Imported [6] | 1,028 | | 997 | | 1,087 | |
| | 1,704 | 7,800 | 1,838 | 7,900 | 2,089 | 10,800 |

[1] Natural Gas Production 913 of which 226 went to the atmosphere and errors in measures. Revised figure 11,951.
[2] Natural Gas Production 984 of which 329 went to the atmosphere and errors in measures.
[3] 4,165 Crude Oil—Part of which went to stock.
[4] Because of the importance of condensate reserves, average crude density is taken as 0.870. 1,000 cubic meters of gas is assumed as one cubic meter of oil in equivalent heating value.
[5] Considered the exchange required for purchase of equipment.
[6] Cost of one ton of crude (average of crude and products) is taken as US $30, plus transportation to Buenos Aires.

eight times between 1945 and 1955—compared with 35% in the USA. Although considerable improvement has taken place since Péron's overthrow, the country's requirements can be met only through investment of foreign capital. Though the Prebisch report of 1955 and the later Verrier report were receptive to foreign capital, they did not openly invite its investment.

The petroleum situation alone appears to present an open-and-shut case for foreign investment. With Argentina isolated from the rest of the world, her petroleum engineers have not attended universities outside their own country for many years. Argentina must count on a 400% growth in oil demand in the next 20 years. In five years alone, consumption will rise to 21 million cubic meters (362,000 b/d) from 14 million. Even with the planned new pipelines, imports in five years will rise to 12.5 million cubic meters from 9.5 million. To fill this gap will take another five years. Cost of the additional required capacity, plus that for the first five-year installations, would be around $1.3 billion—an amount far in excess of capital resources of any one Argentine company or government monopoly. Possibly half this could be generated by private business enterprises within Argentina, but the other half would have to be attracted from foreign investors.

Despite considerable favorable sentiment within Argentina—especially among private business groups—near-term prospects for foreign-capital participation are slight. Some eight thousand replies to a 1957 newspaper poll indicated 86.2% of the people in favor of admitting private oil companies. Nevertheless, there still is considerable sentiment against it. President Aramburu declared during 1957 he favored such participation, but later retracted in face of popular opposition. Dr. Arturo Frondizi, principal radical leader, is openly opposed. Finance Minister Blanco has stated domestic production wolud be increased by "methods similar to Mexico's." Evidently he referred to drilling contracts, such as in Mexico.

Presidential and congressional elections will be held early in 1958. First elections to be held since Péron's overthrow in September 1955, voters' support is being sought by 15 national parties and 26 provincial. An assembly is to be elected for reform of certain articles of the 1953 constitution, important to petroleum.

## Oil Law Summary★

**EXPLORATION:** Duration: 3 years, 2 one-year extensions possible. **Area:** Maximum 150,000 acres in 10 permits per province in non-producing area, 75,000 acres maximum in areas within 30 miles producing well. **Subsoil:** Owned by provinces. Govt. (YPF) holds all areas outside existing private concessions. **Taxes:** One peso per hectare (2.24 US cents per acre) surface tax. **Royalty:** 25% on production during exploration period. **Drilling Obligation:** Rig operating within 18 months, explorer "localized" in 6 months.

**EXPLOITATION: Conversion from Exploration:** Explorer has "right to request" up to ⅓ exploration area for exploitation. **Duration:** Perpetual. **Area:** Maximum 25,00 acres. **Taxes:** Surface tax 10 pesos per hectare (22.4 US cents per acre). **Royalty:** 12%, reducible to 9% with distance & production factors. Payable in kind or cash. **Minimum Expenditure:** 500 pesos per hectare over 4-year period. **Surrender:** Discretionary with concessionaire.

★Taken from *World Petroleum Legislation*, 604 Fifth Ave., N. Y. 20, N. Y. (see p. 37-38)

## REFINERIES IN ARGENTINA—1957

| *Name of Company* | *Plant Location* | *Crude Capacity* | *Type Plant* | *Cracking Capacity* |
|---|---|---|---|---|
| Cia. General Asfaltos | Wilde (B.A.) | 370 | L | — |
| Esso Refinadora de Petroleo | Campana (B.A.) [2] | 37,000 | Comp. | 11,000T |
| | Bahia Blanca (B.A.) | 7,500 | CS | 4,000T |
| | Manuel Elordi (Salta) | 1,500 | S | — |
| | Dadin (P. Huincul) | 500 | S | — |
| Condor | Lomas de Zamora (B.A.) | 750 | SL | — |
| Diadema Argentina SA de Petroleo | Dock Sud Buenos Aires [1] | 25,000 | Comp. | 9,000T |
| La Isaura | Bahia Blanca | 1,800 | SC | 1,000T |
| Lotero y Papini | Avellaneda (B.A.) | 630 | SL | — |
| Ragor SA | Quilmes (B.A.) | 300 | SL | — |
| YPF | Dock-Sud (B.A.) | 5,500 | Comp. | 3,000T |
| | La Plata [3] | 100,000 | Comp. | 67,400TC |
| | San Lorenzo (Santa Fe) | 18,800 | SC | 13,000T |
| | Lujan de Cuyo (Mendoza) [4] | 12,500 | SC | 9,000T |
| | Chachapoyas (Salta) | 2,500 | SC | 1,300T |
| | Plaza Huincul (Neuquen) | 1,550 | SC | 1,100T |
| Petroquimica (EN) | Comodoro Rivadavia | 5,500 | SC | 2,000T |
| | Total | 216,670 | | 113,340TC |

[1] 3,000 b/d thermal reforming capacity.
[2] 47,000 b/d topping plant projected.
[3] 18,400 b/d fluid catalytic cracking capacity. 25,000 b/d thermal cracking capacity, and 22,000 delayed cocking.
[4] 28,000 b/d topping plant and cracking unit projected.

Capacities are in barrels per day. Key to type of plant: S—skimming: L—lubricating: A—asphalt: C—cracking: Comp.—complete. Under cracking capacity to indicate type: T—thermal; C—catalytic. All data as of December 1, 1957.

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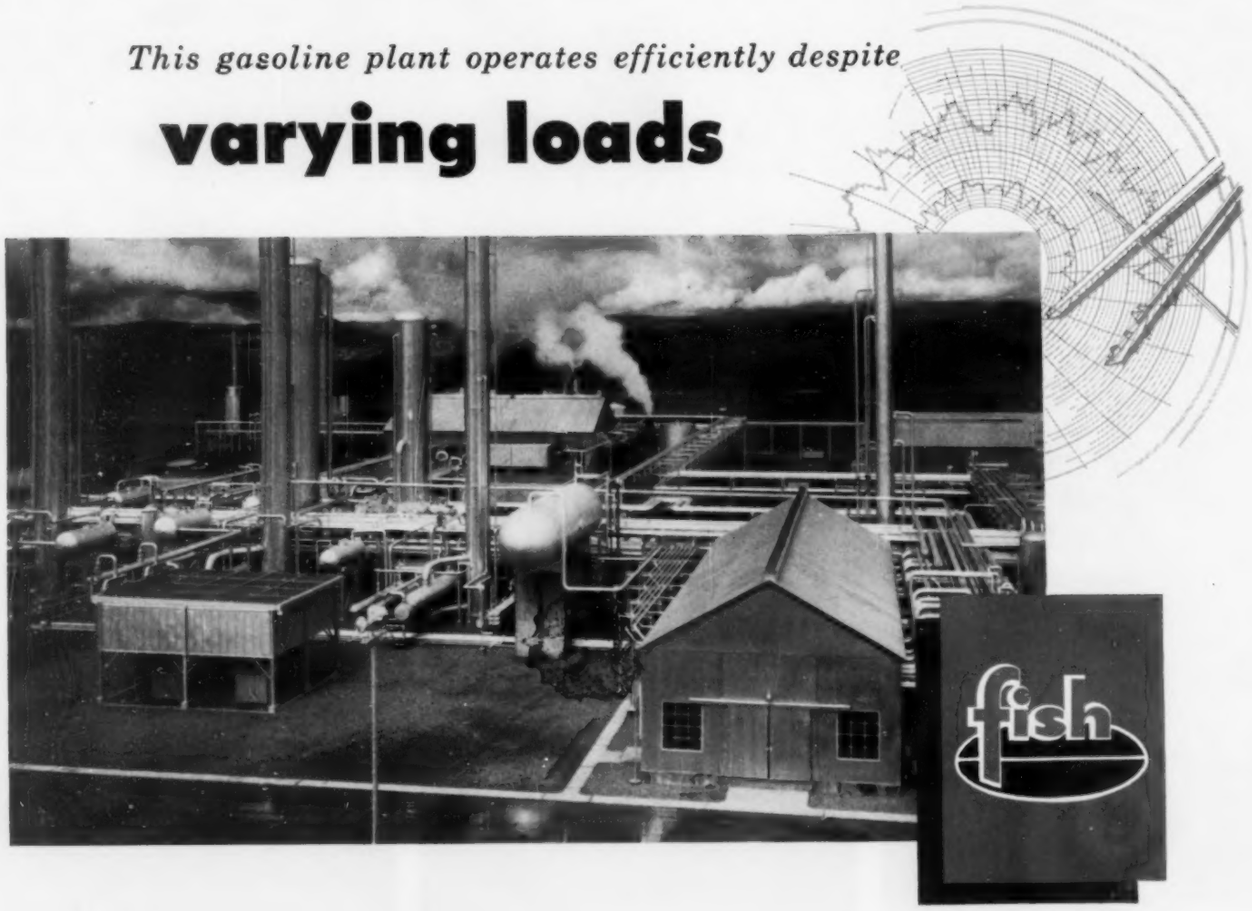
*This gasoline plant operates efficiently despite*

# varying loads




The San Juan gasoline plant of the Pacific Northwest Pipeline Corporation is big! It was designed to handle 300 million cubic feet of gas per day and recover 340,000 gallons of liquids. But efficient operation over a wide range of loads was necessary.

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# BOLIVIA

## PHYSICAL DEVELOPMENT

**Exploration:** Increased interest during 1957 brought the concession holdings shown on accompanying map. Shell Prospection is a subsidiary of Shell Oil Co. Bolivian Gulf is owned 80% by Gulf Oil Corp.; 20% by Falcon Seaboard Drilling Co., Williams Bros., and Barry & Reiner Inc. The McCarthy concession has been taken over under option from the government by TULM Corp., owned by Tennessee Gas Transmission Co. (35%), Union Oil & Gas Corp. (25%), Lion Oil Co. (25%), and Murphy Corp. (15%). $1.5 million was paid McCarthy for equipment, and a similar amount will be paid from production. Payments to the government are not known.

Andes Oil Co., owned equally by Pure Oil Co., Standard Oil Co. (Ohio), and Hancock Oil Co., has a concession. During December 1957 another group, not shown on the map—consisting of White Eagle International Oil Co., Blackwell Oil & Gas Co., and Western Hemisphere Petroleum Corp., all of Tulsa—obtained a concession on 1,200,000 acres in Zone 1, plus 988,000 acres in Zone 2. The acreage borders that of Shell Prospection Co. Ltd.

Bolivian Gulf is drilling a wildcat well at Boyuibe, Santa Cruz. Site is north of the Marareti test, in the Mandeyapecua area.

Bids were submitted by another group, Consolidated Cuban Petroleum Corp., in the name of Bolivian American Oil Co., during 1957, covering about 488,796 acres for reconnaissance in Zone I, and 389,145 acres in Zone II.

During 1957 bids were invited by YPFB on the Yacuiba area ,some 108,000 acres of which overlap the producing Madrejones structure in Argentina.

The "Comision Mixta" area, where exploration rights are held by Brazil, was established in 1938 under a separate treaty. Bolivia gave exploration and pipeline rights to Brazil and, under separate treaty, Brazil agreed to complete a railway from Santa Cruz in Bolivia to Corumba in Brazil, where it links with Brazilian lines to the coast. Part of the cost was offset against an old debt by Brazil; the rest was to have been repaid by a 40-year loan at 3% interest guaranteed by oil produced from the Comision Mixta area. The amount of the loan is now claimed to be $30 million by Brazil, but negotiations on the area have come to a standstill—mainly because Petrobras insists on being represented in talks but, as a government agency, is barred by Bolivia's new law from having oil rights in the country. The latest proposal split the area at the 19th parallel—the northern half to be developed by Bolivian-Brazilian companies, and the lower half to revert to YPFB which could then give oil rights over it. No action is likely for some years.

Another company, Cataract Mining, reportedly acquired acreage in Bolivia through Lombardo Bros.-Kiel partnership. Cost was $1.5 million. Location is not known.

**Production:** Bolivian production averaged 9,800 b/d during 1957, and did not vary much from that level in any month. There is substantial unused capacity which will be able to produce when new pipelines are finished.

**Transportation:** Bolivia currently has 765 miles of crude pipelines, and is adding to them on both sides of the country. The 4½-in. Camiri-Santa Cruz line was completed in August 1957. Work has begun by Williams Bros. on a 215-mile line from Sicasica in the Bolivian interior (see map) to Arica on the Pacific coast. The line is 171 miles of 10-in. and 44 miles of 8-in. pipe. Capacity is 6,000 b/d initially—with inherent capacity of 50,000 b/d with addition of two pumping stations.

Another line is proposed from Villa Montes, Bolivia, across the Paraguayan Chaco to Asuncion, some 450 miles. Agreement on the line was signed early in 1957, and the French company, Fives-Lille, will build the Paraguay section of the 6⅝-in. line. A second agreement foresees another line (financed by Bolivia) through Paraguay for export.

**Refining:** No additions were made to Bolivian refineries during the year. Runs to stills were slightly lower in 1957.

**Marketing:** Consumption during 1957 declined, as shown in accompanying tables. Exports continued to rise, and will go up more sharply in coming years as land-locked Bolivia is provided access via pipelines to the sea.

### REFINERIES IN BOLIVIA—1957

| *Name of Company* | *Plant Location* | *Crude Capacity* | *Type Plant* | *Cracking Capacity* |
|---|---|---|---|---|
| Yacimientos Petroliferos Fiscales Bolivianos | Cochabamba [1] | 6,000 | S | — |
| | Sucre | 4,000 | S | — |
| | Camiri | 1,500 | S | — |
| | Sanandita | 400 | S | — |
| | Total | 11,900 | | |

[1] 1,500 b/d Platformer under construction.

Capacities are in barrels per day. Key to type of plant: S—skimming. All data as of December 1, 1957.

## OIL LAWS

No changes occurred in Bolivia's oil laws during 1957. The laws are generally favorable to development by foreign capital.

### BOLIVIA—PRODUCTION AND DRILLING DATA
(As of November 30, 1957)

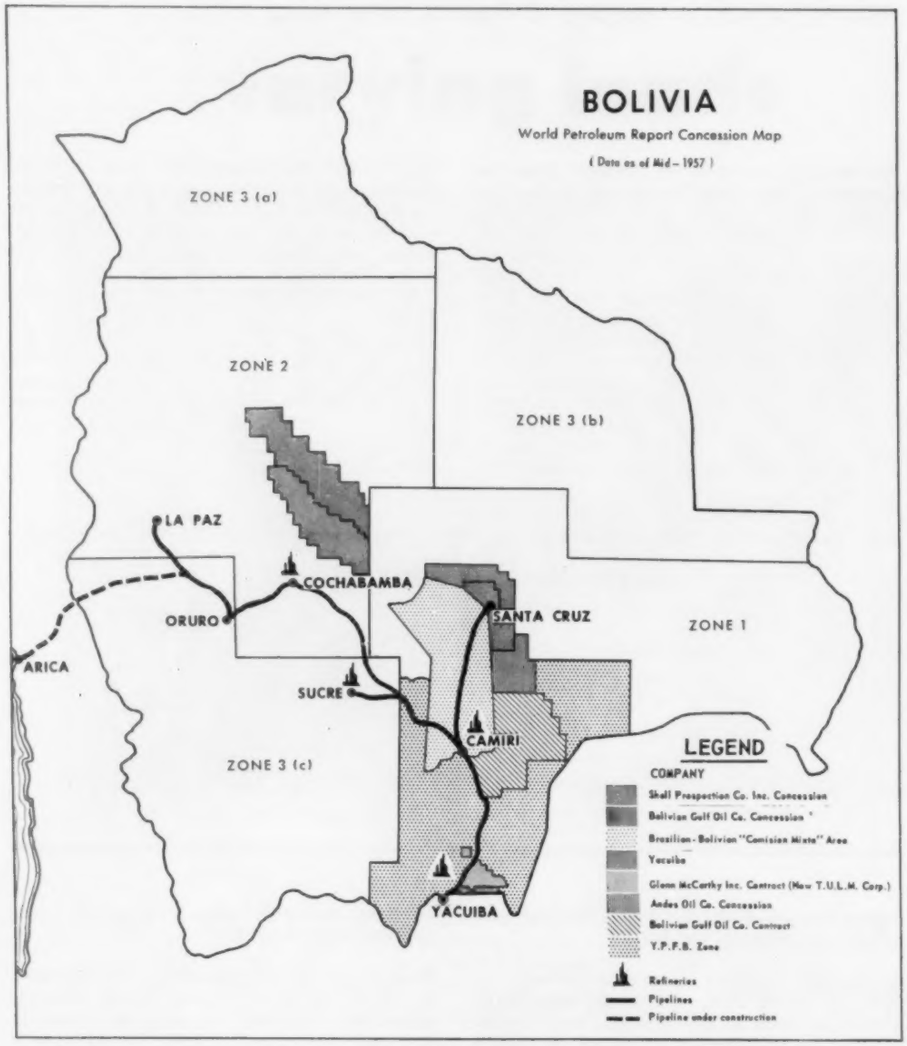
| Name of Field | Wells Drilled | Meters Drilled | Year Discovered | Flowing Wells | Pumping Wells | Yearly Production (Cubic Meters) | Yearly Production (Barrels) | Crude Production (Barrels Per Day) | API Gravity | Producing Formation |
|---|---|---|---|---|---|---|---|---|---|---|
| Camiri* | 17 | 18,134.35 | 1926 | 47 | 4 | 392,630.50 | 2,469,645.85 | 7,484 | 54-59 | Devonian |
| Bermejo** | 2 | 3,657.68 | 1922 | 7 | 5 | 27,500.50 | 172,978.15 | 525 | 26-27 | Permian-Carboniferous |
| Gauiruy | 6 | 4,094.65 | 1946 | 12 | — | 58,141.50 | 365,710.04 | 1,108 | 54-59 | Devonian |
| Sanandita | 3 | 1,376.05 | 1926 | — | 13 | 5,783.70 | 36,379.47 | 110 | 42 | Permian-Carboniferous |
| Toro | 6 | 6,377.39 | 1955 | 5 | — | 33,859.67 | 212,977.32 | 645 | 21-54 | Devonian-Permian-Carboniferous |
| Totals | 34 | 33,640.12 | | 71 | 22 | 517,915.87 | 3,257,690.83 | 9,875 | | |

*Camiri—Includes three exploratory wells, It-2, BV-4, and Cr-1.
**Bermejo—Includes one exploratory well, A-1.
**Note:** As of June 30, 1957, total reserves of the country were estimated at 70 to 80 million barrels.

## NATIONAL FACTORS

The principal detrimental investment factors in Bolivia appear to be correcting themselves. The extreme political instability and unfavorable governmental attitude were reversed in recent years, and a stable government has passed the oil law which makes operations possible by outside concerns. Another major drawback was the ruinous inflation which hit Bolivia. Sweeping currency reform, and introduction of a fluctuating exchange rate, have replaced the complicated system of controls, but the deflationary trend which ensued caused considerable unemployment. If the price of tin, on which Bolivia is heavily dependent, were not supported by the International Tin Agreement, the situation would be worse.

The new currency arrangement, begun December 17, 1956, removed all foreign-trade controls and put the unit of currency, the boliviano, at about 7,550 per dollar. It now has a single fluctuating official rate, and is fully transferable. END




**BOLIVIA—REFINING AND MARKETING**
(Barrels)

| | Consumption | | Imports | | Exports | | Production | | Refinery Runs | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1957 | 1956 | 1957 | 1956 | 1957 | 1956 | 1957 | 1956 | 1957 | 1956 |
| Crude oil | | | | | 994,464 | 538,122 | 3,511,959 | 3,195,460 | 2,485,384 | 2,808,585 |
| Fuel oil | 608,679 | 724,625 | | | | 18,498 | | | 709,311 | 921,340 |
| Diesel oil | 364,996 | 329,351 | | | 35 | 840 | | | 390,929 | 363,299 |
| Kerosine | 221,199 | 224,616 | | | 12,068 | 8,404 | | | 254,357 | 264,579 |
| Ordinary gasoline | 553,442 | 560,484 | | | | | | | 1,034,831 | 1,159,548 |
| Extra gasoline (75 ON) | 17,591 | 29,736 | | | 208,976 | 200,591 | | | | |
| Gasoline (80 ON) | 771 | 2,006 | | | | | | | 1,087 | 2,113 |
| Gasoline (100-130 ON) | 78,138 | 112,119 | 90,919 | 118,912 | | | | | | |
| Gasoline (91-98 ON) | 12 | 3,189 | | 2,656 | | | | | | |
| Aviation gasoline (80 ON) | 48 | 47 | 262 | | | | | | | |
| Aviation gasoline (100 ON) | 631 | 2,078 | 5,237 | 4,582 | | | | | | |
| Aviation gasoline (120 ON) | 716 | 1,024 | 1,047 | 2,618 | | | | | | |
| Others | 2,101* | 2,965* | | | | | | | 50,911 | 42,049** |
| Losses | | | | | | | | | 43,958 | 55,657 |

**Note:** Data for the last three months are based on averages for previous months.
*Includes naphtha, ether, solvents, and turpentine.
**Includes gas, ether, and solvents.
**Source:** Yacimientos Petroliferos Fiscales Bolivianos.

**BOLIVIA—DESTINATION OF EXPORTS CRUDE AND PRODUCTS**

| Country | Type | Amount Per Year (Barrels) 1957 | 1956 |
|---|---|---|---|
| Argentina: | Camiri crude[1] | 617,871 | 416,398 |
| | Bermejo crude[1] | 376,593 | 121,724 |
| | Sanandita fuel oil[1] | 13,416 | 18,498 |
| Chile: | Motor fuel[2] | 107,943 | 123,584 |
| Brazil: | Motor fuel[2] | 97,319 | 74,832 |
| | Kerosine[2] | 12,014 | 8,061 |
| Paraguay: | Motor fuel[3] | 1,971 | 2,175 |
| | Kerosine | 54 | 343 |
| | Diesel oil | 35 | 840 |
| Peru: | Motor fuel[2] | 5,000 | — |

[1] Exports to Argentina during November and December 1957 are estimated on basis of 12,600 bbl. for Camiri and 9,450 bbl. for Bermejo. Fuel oil from Sanandita estimated on basis of 5,000 tons exported.
[2] Exports to Chile, Brazil, and Peru for November and December 1957 estimated on basis of existing agreements—plus 1,600,000 liters to Peru on agreement not yet effective as of November 19, 1957.
[3] Paraguay exports only to August 1957.
**Source: YPFB.**

## *Oil Law Summary*★

**RECONNAISSANCE:** May be done under preliminary permit. No specified area. **Duration:** 1 yr.; extensions possible. **Bond:** $5,000.

**EXPLORATION:** Country divided into three zones. **Duration:** 4 yrs. Zones 1 and 2; 6 yrs. Zone 3. Extensions possible 2 yrs. each Zones 2 and 3 only. **Area:** 150,000 hectares Zone 1; 400,000 hectares Zone 2; 750,000 hectares Zone 3; maximum per concessionaire, 500,000, 1,500,000, and 3,000,000 hectares in Zones 1, 2, 3 respectively. **Annual Surface Tax:** 5 US cents per hectare Zone 1; 3 US cents Zone 2; 2 US cents Zone 3. Higher during extensions. Royalty deductible. **Minimum Investment:** 80 US cents per hectare Zone 1, 50 US cents Zone 2, 20 US cents Zone 3.

**EXPLOITATION:** Duration: 40 yrs. No extensions. **Area:** Max. ½ exploration area. **Guaranty:** 40 US cents per hectare Zone 1, 20 US cents per hectare Zone 2, 10 US cents per hectare Zone 3. **Drilling Obligation:** 15,000 ft. per 247,000 acres held first 7-yr. period. Following 8 yrs., 30,000 ft. per 50,000 acres held. **Surrender:** Anytime. **Transfer:** With govt. consent only. **Surface Tax:** Initial tax 40 US cents per hectare Zone 1, 30 US cents Zone 2, 20 US cents Zone 3. **Annual Surface Tax Per Hectare:** Rises from 15 US cents Zone 1, 10 US cents Zone 2, 8 US cents Zone 3—during 1st five years—to (during years 31-40) US $1.00 Zone 1; 50 US cents Zone 2; 30 US cents Zone 3. Royalty deductible. **Royalty:** 11%, in cash or kind. Reducible in Zones 2 and 3 to 7½% for 15 yrs. **Income Tax:** 30%. **Depletion Allowance:** 27% gross up to 50% net. **Additional Tax:** Levied to divide income 50%-50%. Tax limited to 50% net income. General taxes of country not applicable. **Import Duties:** Exempt. **Export Duties:** Exempt. **Exchange Restrictions:** Exempt.

**REFINING AND TRANSPORTATION:** 40-year concession grantable to exploitation concessionaire. Subject to general taxes.

★Source: *World Petroleum Legislation*, 604 Fifth Ave., N. Y. 20, N. Y. (see p's 37-38)

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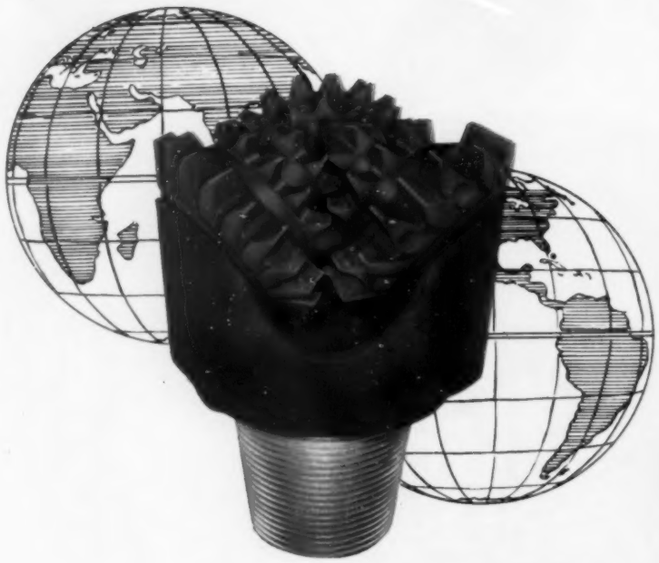

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**1957-58 COMPOSITE CATALOG**

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ENGINEERING DIVISION

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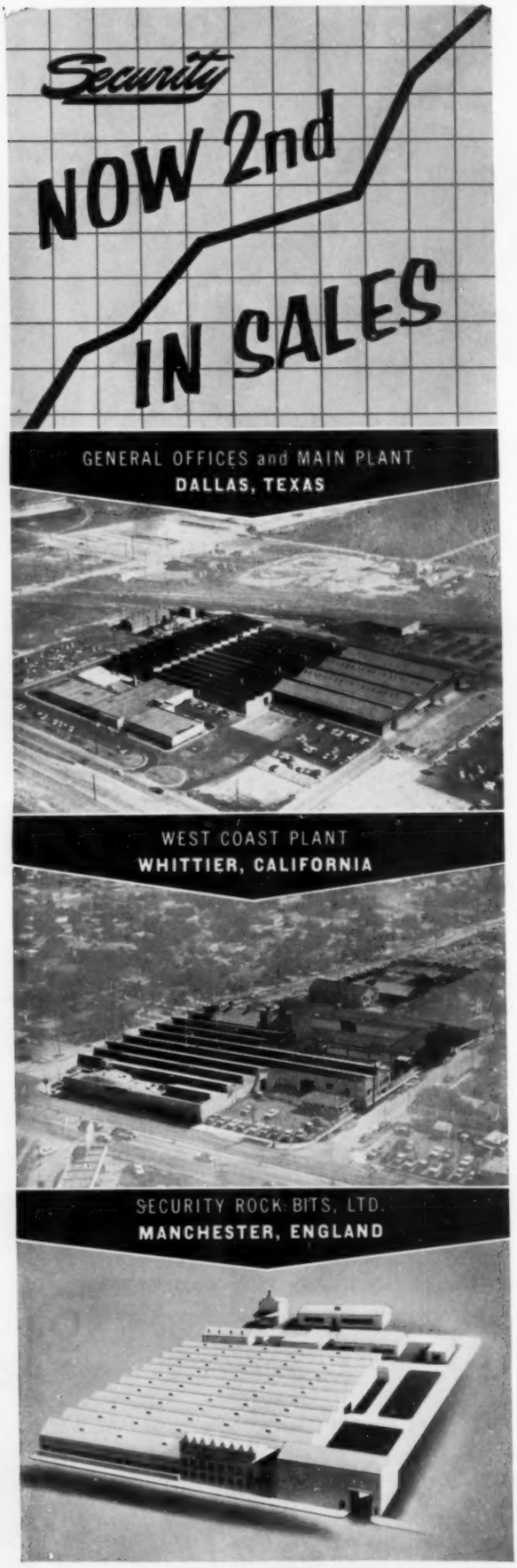


# BRAZIL

## PHYSICAL DEVELOPMENT

**Exploration:** The total effort and money expended on exploration in Brazil continued to mount during 1957, but results were disappointing—and no important discoveries were made. It begins to look, surprisingly enough, as if Brazilian oil potential is not so good as commonly supposed.

Exploration and refining are a monopoly of the government through Petrobras, and expenditures were planned by the latter at seven billion cruzeiros (US $140 million) during 1957—of which 2.7 billion was reserved for exploration. 54 rigs were operating at the end of 1957, and a total of 38 crews—including 15 seismograph, 8 gravity, and 15 geological—are operating. About 44 wildcats were drilled in 1957, of which 11 were in the Amazon basin, 7 in Maranham, 5 in Sergipe-Amagoas, 18 in Bahia, and 3 in Parana-Sao Paulo. 34 stratigraphic wells were drilled, and the total of wildcat plus stratigraphic footage reached 441,155 ft., compared with 134,829 ft. in 1956.

The major area of interest is the Amazon basin, about 43% of Brazil's sedimentary basin area. The best discovery to date, No. 1-AZ well at Nova Olinda, proved less productive than expected, and was shut down while offsets were drilled. The second offset, No. 2-AZ, was about ½ mile away. It found oil and gas, and yielded 1,450 bbl under test, with diminishing pressure, until about May 26 when it dropped to 10 b/d due to accumulation of paraffin in the tube. Three more wells are drilling in the same area.

Oil and gas shows were obtained in August at 7,208 ft from JA-1-AL on the Jequia River, 24 miles southwest of Maceio, Alangoas, where drilling had been started on March 20. The horizon between 5,089 ft and 5,100 ft increased from average to extremely strong pressure in 11 min through a ¼-in. choke. Yellow-greenish oil, with high gas pressure, flowed 125 b/d of 41 API crude.

During the first six months of 1957 wildcat footage drilled had reached 185,728 ft; development wells, 78,972 ft—compared with 121,595 ft and 44,609 ft in the corresponding period of 1956.

Recent discoveries in Brazil's only producing area, Bahia Reconcavo, extended the Dom Joao field, and may raise production to 40,000 b/d in 1958 and eventually to 80,000 b/d. The first was X-1 Dom Joao (DJX-1), which early in August came in at about 1,200 b/d, extending the Dom Joao field. A second, DJX-2, found production in 246 ft. of net pay. It is about one mile farther out in the bay from DJX-1, which was nearly two miles from the field's southern limit. The Mata de Sao Joao field was extended by SP-1-BA at San Pedro which found porous arenite, oil-saturated, at 5,691 ft., with similar shows at 3,221 ft. to 3,273 ft.

In the Sergipe and Alagoas areas, north of Bahia, two wildcats apparently have opened a new producing area of minor size. JA-1 found about 140 b/d at 5,137 ft. to 5,150 ft.; while another well, about three miles northeast, TM-1, found some shows—believed noncommercial—at 5,132 ft. to 5,138 ft.

**Reserves:** Crude proved reserves, as of January 1, 1957, were 346 million barrels. These had risen to 348 million barrels by June, according to President Kubitschek.

**Production:** Completion of pipeline facilities has increased Brazil's production to about 25,400 b/d during 1957. This is still only a small fraction of the country's total consumption.

**Refining:** During 1957 a new refinery was completed and placed onstream at Manaus. It was unusual in being a privately owned plant, financed by local Brazilian capital, while new refining construction is a monopoly by Petrobras.

Two more new refineries are planned. One will be at Corumba, Mato Grosso, to process Bolivian crude. Initial funds have been approved by the government.

A 90,000 b/d plant is to be built by the government in the municipality of Duque de Caixias, adjoining the Federal District, the Rio-Sao Paulo and Rio-Bahia roads, and the Leopoldina railway. Cost will be $55 million; construction by Universal Oil Products. Construction began during September. Ethylene, styrene, benzene, butadiene, and synthetic rubber facilities are included.

Petrobras has also announced a 25,000 b/d refinery in Minas Gerais in 1957-58.

Petrobras refines about 55% of Brazil's consumption, based on 1956 figures. Savings in foreign exchange are estimated at about US $46.4 million in 1956 by Petrobras, including national production.

The National Petroleum Council of Brazil has adopted a resolution against monopoly in any new petrochemical industry in the country, and in favor of government operation of such an industry if private industry does not do the job adequately.

The resolution repeats, however, that the national policy favors private enterprise in such an operation, but only if it can do the job with due respect to needs of consumers, and without monopoly.

**Marketing:** Consumption during 1957 rose to about 211,000 b/d, from 204,931 b/d in 1956. Domestic production supplied about 12.3% of the country's total consumption in 1957; the remainder was imported. Imports of oil absorb 18% of Brazil's export earnings. Brazilian refineries supply about half the country's needs—including 73% of gasoline needs and half fuel-oil consumption—but are far short of distillates and kerosine consumption needs.

Until recently, marketing has been open to foreign companies on comparatively liberal terms. During October 1957, a decree was signed which sets out rules for distribution companies, defining pricing and marketing quotas. While it will tighten existing regulation, it may lead to opening of the market to more companies than the five majors who have retained the lion's share of the market until now.

**BRAZIL—REFINING AND MARKETING**

| | CONSUMPTION (Thousands of Barrels) 1956 | FOREIGN TRADE Imports 1956 (Metric Tons) | 1957 1st 3 Months (Barrels) | REFINERY RUNS 1956 (Metric Tons) |
|---|---|---|---|---|
| Crude oil: Nominal capacity 92,800 b/d; runs 112,382 b/d 1956 | | 4,889,108 | 9,759,477 | 112,382 b/d |
| Fuel oils | 27,357 | 1,782,001 | 3,826,829 | 15,611 |
| Diesel-gas oils | 12,102 | 1,204,326 | 907,162 | 2,892 |
| Kerosine (illuminating) | 4,854 | 599,001 | 145,128 | 227 |
| LPGas | 1,620 | 46,439 | 360,478 | 1,345 |
| Gasolines: | | 284,830 | | |
| Aviation (100 ON plus) | 2,280 | | | — |
| Motor, premium (90 ON plus) | 712 | — | 249,784 | 299 |
| Regular (88 ON plus) | 22,100 | 468,858 | 3,743,863 | 17,894 |
| Lubricating oils | 2,089 | 194,792 | | 2 |
| Solvents | 424 | 2,561 | 82,671 | 385 |
| Asphalt | 170 | 3,930 | 77,474 | 342 |
| Greases | 78 | 1,000 | | |
| Vaseline | | 1,351 | | |
| Signal oil | 2 | 473 | | |
| Paraffin | 115 | 10,406 | | |
| Others | | | | |
| Totals | 73,903 (202,474 b/d) | 9,489,077 (190,000 b/d) | | 39,007 |

**Note:** Total consumption for 1957 is estimated at 74,825,000 bbl., or 205,000 b/d. Imports for the 1st three months of 1957 were 7,747,699 bbl., or 86,086 b/d.

**BRAZIL—PRODUCTION AND DRILLING DATA**

| Name of Field | Year Discovered | Depth (Feet) | API Gravity | Production (Barrels Per Day) 1956 |
|---|---|---|---|---|
| Agua Grande: | | | | |
| Catu sand | 1953 | 600 | 41.0 | |
| "A" zone | 1950 | 3,400 | 40.0 | 4,300 |
| Sergi sand | 1952 | 3,400 | 42.0 | |
| Aratu | 1942 | 1,500 | 32.0 | |
| | | 2,500- | | |
| Candeias | 1941 | 3,700 | | 4,165 |
| Dom Joao | 1947 | 800 | 22.0 | 1,761 |
| Itaparica: | | | | |
| "A" zone | 1943 | 2,000 | 36.0 | 130 |
| Sergi sand | 1942 | 2,500 | 35.0 | |
| Lobato | 1939 | 1,900 | 32.0 | 7.9 |
| Mata de Sao Joao: | | | | |
| Victoria sand | 1952 | 1,350 | | |
| "A" zone | 1951 | 3,300 | 40.0 | 690 |
| Sergi sand | 1953 | 3,300 | 37.0 | |
| Paramirim | | | | 51 |
| Pedras | | | | |
| Pitanga | | | | 8 |
| Pojuco Central | | | | |
| Others | | | | |
| Average production, b/d | | | | 10,900 |

**Note:** Daily average production in the first 10 months of 1957, all fields, was 25,230 b/d.
Number of wells, as of Oct. 31, 1957, was 349 oil and 36 gas.
Total crude-oil reserves for the country, as of Jan. 1, 1957, were 346,000,000 bbl. (government estimate).

**REFINERIES IN BRAZIL—1957**

| *Name of Company* | *Plant Location* | *Crude Capacity* | *Type Plant* | *Cracking Capacity* |
|---|---|---|---|---|
| Companhio de Petroleo da Amazonia | Manaus | 5,000 | | |
| Distillaria Riograndense de Petroleo S.A. | Uruguaiana Rio Grande do Sul | 300 | S | — |
| Industrias Matarazzo de Energia S.A. | Sao Paulo | 500 | S | — |
| Petroleo Brasileiro S.A. (Petrobras) | Mataripe [1] | 5,000 | SC | 3,000T |
| | Cubatao Presidente Bernades [2] | 65,000 | SC | 8,000T |
| Piranga S.A. Cia Brasileira de Petroleo | Rio Grande do Sul | 6,000 | SCA | 2,000T |
| Refinaria e Exploracao de Petroleo Uniao | Sao Paulo [3] | 20,000 | S | — |
| Refinaria de Petroleo de Manguinhos | Rio de Janeiro | 10,000 | S | 3,400T |
| | Total | 111,800 | | 16,400T |

[1] Under construction: Crude capacity to be increased to 37,000 b/d, 2,800 b/d lube plant; complete early 1958.
[2] 116,000 tons/year asphalt capacity. Under construction: Crude capacity to be increased to 90,000 b/d. Current crude runs 72,000 b/d. Ethylene recovery unit completed 1957. Fertilizer plant 340 t/d operating.
[3] Actually processing 31,000 b/d.
Note: Petrobras to build 80,000 b/d refinery in Federal District and two other refineries at undisclosed locations.

Capacities are in barrels per day. Key to type of plant: S—skimming; A—asphalt; C—cracking. Under cracking capacity to indicate type; T—thermal. All data as of December 1, 1957.

Aggregate consumption of petroleum derivatives is increasing very rapidly, and rose sixfold from 1939 to 1954. It is estimated, by a recent UN study, to increase from 7.3 million tons consumption of all oil products in 1954 to 15.3 million tons in 1962—an average rate of increase of 7.2%, compared with 10.7% in the 1940-49 period and 12.6% between 1939 and 1954.

**BRAZIL: PROJECTION OF CONSUMPTION OF FUELS AND LUBRICANTS**
**(Thousands of tons)**

| | 1954 | 1962 | % Increase |
|---|---|---|---|
| Gasoline (other than aviation) | 2,408 | 5,514 | 129 |
| Fuel oil | 3,033 | 5,058 | 67 |
| Diesel oil | 1,229 | 2,784 | 127 |
| Kerosine | 539 | 1,014 | 89 |
| Aviation gasoline | 218 | 517 | 137 |
| Imported coal | 808 | 1,200 | 49 |
| Domestic coal | 2,019 | 3,700 | 83 |
| Lubricants | 209 | 418 | 100 |
| Charcoal | 1,315 | 1,823 | 39 |
| Bagasse | 5,703 | 9,524 | 67 |

Source: Economic Commission for Latin America.

**BRAZILIAN WILDCAT DRILLING**
**(September 12, 1957)**

| Well | Depth (Feet) |
|---|---|
| **Amazon Basin** | |
| NO-3-AZ (Nova Olinda) | 11,586 |
| UA-1-AZ (Uraria) | 8,603 |
| TA-1-PA (Tapaiuna) | 3,562 |
| NO-4-AZ (Nova Olinda) | 5,726 |
| MN-ST-1-AZ (Manaus) | 4,137 |
| AIST-1-AZ (Acari) | 1,995 |
| **Maranham Basin** | |
| Md-1-MA (Mirador) | 4,160 |
| JU-2-MA | 6,536 |
| **Alagoas** | |
| TM-1-AL (Taboleiro dos Martins) | 9,032 |
| JA-1-AL (Jequia) | 7,208 |
| **Bahia Reconcavo South** | |
| SP-1-BA (Sao Paedro) | 5,349 |
| BP-1-BA (Boipeba) | 7,589 |
| **Parana** | |
| RC-1-PR (Rio Claro) | 6,474 |
| **Sao Paulo** | |
| PE-ST-1-SP (Presidente Epitacio) | 8,105 |

## OIL LAWS

While Brazil's oil law is not unfavorable to operations, the qualification that operating companies must be Brazilian-owned—plus the 1953 reservation of oil activities to Petrobras, the government company—has prevented operations. During 1957, an alternate oil law was proposed by Deputy Adolfo Gentil in the Federal Chamber of Deputies. Known as Bill 2,586 of 1957, it retained the existing structure of government companies, including Petrobras, but defined Petrobras' limit of activities by assigning it a reserved section of the country's sedimentary area. Private (but not foreign) companies would be authorized to sign contracts with the government for exploration and exploitation on a bid basis. Only Brazilians or companies owned entirely by Brazilians would be permitted to bid. The net effect of the bill, therefore, would be only to eliminate the monopolistic feature of Petrobras.

Principal provisions of the bill are: *Exploration*: Duration, 20 years. Area, 2,470 acres per concession; no limit per concessionaire; area reduced 50% at end of first five years and 50% at end of following 10 years. *Exploitation*: On discovery, 50% of the area must be converted to exploitation concession. Refining rights would be contained in the contract for exploration-exploitation, including pipelines and storage. Companies would be exempt from import duties on equipment for operations. Annual taxes during exploration period are Cr. 5 per hectare during first five years, Cr. 10 per hectare during 5-10 years, Cr. 25 per hectare thereafter. Annual tax on exploitation area, Cr. 25 per hectare, rising to Cr. 250 per hectare in subsequent three years, and Cr. 500 per hectare thereafter. Royalty would be 10%, in form of annual tax on value of production. Supplementary tax would bring contractor's profit to 50% of "real profit." Depletion allowance is 27½% of gross value of production. During first 10 years of exploration, 25% of profits would be permitted, provided resulting savings are re-invested. Any losses can be carried forward, up to 30% of total revenue.

Profit remittances are guaranteed to cover "contractual obligations" abroad.

## Oil Law Summary★

**EXPLORATION:** Grantable only to Brazilians or to companies controlled by Brazilians. Oil decreed govt. monopoly. **Duration:** 2 yrs., with renewals "for successive periods not exceeding two" at govt. discretion. **Area:** Max. per concessionaire, 50,000 acres. **Ownership:** Except marketing, oil industry govt. monopoly under Petrobras. Originally 100% govt.-owned, Petrobras may now have other Brazilian shareholders (not exceeding 49%). **Transfer:** To Brazilians only. **Fiscal:** Surface tax, US $0.0112 per acre, with min. $0.56 per permit. **Drilling Obligation:** Work must be started within 6 mos. **Conversion to exploitation:** Guaranteed.

**EXPLOITATION: Duration:** To be specified in each concession. **Area:** Max. per concession, 25,000 acres—max. per concessionaire 125,000 acres. **Transfer:** To Brazilians only. **Fiscal:** Surface tax, US $0.0056 per acre (double explrn.). **Royalty:** 10%. Petrobras pays states and territories 5% of production value. **Drilling Obligation:** Work must start within 6 mos. **Income Tax:** 20% maximum. Petrobras exempt.

★Taken from *World Petroleum Legislation*, 604 Fifth Ave., N. Y. 20, N. Y. (see p's 37-38)

## NATIONAL FACTORS

The principal factor influencing petroleum investment continues to be the reservation of oil development and exploration to the government. The monopoly has been criticized especially Petrobras' habit of pointing to the exchange savings involved in use of Petrobras' refineries which critics point out was achieved by preferential exchange rates and was a job any private concern could have done.

There remains, however, practically no political hope of overcoming the opposition to the entry of foreign capital. The economic situation is growing worse—with coffee exports (70% of Brazil's export earnings) down to 10 million bags in the first nine months of 1957, compared with 12½ million in the same period in 1956. Since oil imports take about $280 millions, and foreign exchange reserves are dwindling fast, the impact of retrograde oil development may hit hard during 1958.

It seems obvious that in an area as big as the United States and much less accessible in some parts, an equal effort for oil development is called for. The crux of the situation is that Petrobras' resources are less than 1/1,000 of the effort needed. END

# ECUADOR

## PHYSICAL DEVELOPMENT

**Exploration:** No exploratory discoveries were made during 1957 — although encouraging shows were found by California Ecuador Petroleum Co., Socal subsidiary, in No. 1 Santo Domingo wildcat. Manabi Exploration Co., owned 50.5% by Pantapec Oil Co., drilled an exploratory well of interest at Manta No. 4, the first outside the Santa Elena peninsula since 1947; but no shows were reported.

About 10 miles west of California Ecuador's wildcat, West Pacific Petroleum Co., subsidiary of Israel Mediterranean Petroleum Inc. and Pan-Israel Oil Co. Inc., has taken a concession. Several companies have offshore rights, as shown on the accompanying map; and California Ecuador is doing offshore seismic work on its area. Anglo Ecuadorian is doing directional drilling from the shore of its Ancon concession, which extends 1.5 miles out to sea and 45 miles along the coast.

**Production:** Production levels showed no important change during the year. Progressive decline continued with the depletion of old fields. END.

## Oil Law Summary★

**EXPLORATION: Duration:** No restriction on surface reconnaissance before title. Exploration concessions of two types: Contract and claim (denuncio). Duration by contract, 5 yrs.; by claim, 2 yrs. In Oriente region, 3-yr. extension by contract, 1-yr. by claim. **Area:** Max. per concn. by claim, 200 acres; by contract, 125,000 acres—with increases under special conditions. No max. per concessionaire. **Subsoil:** Govt. **Ownership:** No restriction. **Surrender:** Any time. **Annual Surface Tax:** $0.005328 per acre (20 centavos per hectare) 1st 2 yrs., $0.010656 3d yr., $0.021312 4th yr., $0.0264 (1 sucre per hectare) 5th and subsequent years. **Drilling Obligation:** Begin "operations" in 2 yrs. or lose bond.

**EXPLOITATION: Conversion:** May cover all of exploitation area. **Duration:** By contract, 40 yrs., with 10-yr. extension. By claim, 20 yrs., with 5-yr. extension. **Area:** Max. per concn. by contract, 125,000 acres, with increases possible; by claim, 200 acres. Exploitation area may be same as exploration. **Ownership:** No restriction. **Surrender:** Any time. Exploration concession areas surrendered or cancelled are added to "national" reserves. **Min. Annual Investment:** Fixed in each concession text. **Annual Surface Tax:** Same as for exploration (see above). In eastern region to be fixed by govt. **Royalty:** Sliding scale beginning with 11% net product for 0 to 32 mi. from shipping port, down to 5% for 375 mi. and over. Payable in kind or cash. By agreement with govt., concessionaire may undertake public works in lieu of royalties. **Surrender:** Any time. **Transportation and Refining:** 30-yr. concessions grantable but not obligatory to producers. **Income Tax:** 22% tax max.

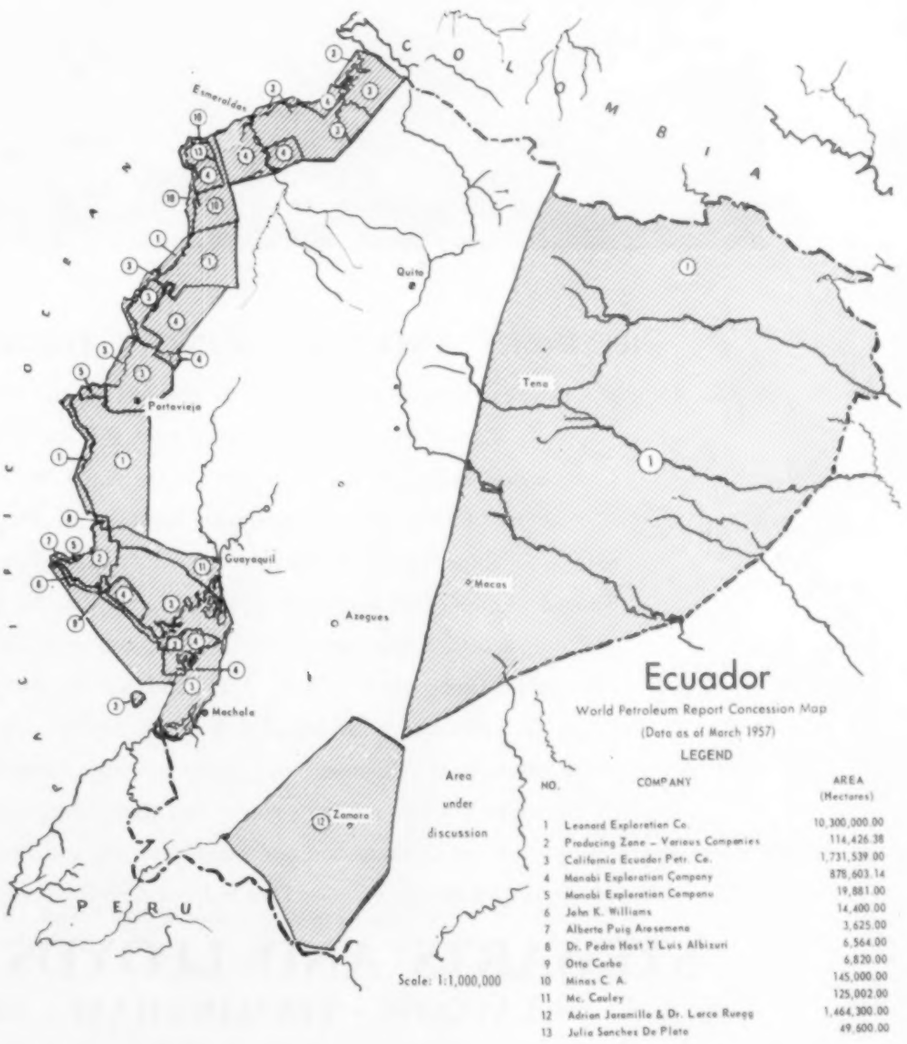
★Taken from *World Petroleum Legislation*, 604 Fifth Ave., N. Y. 20, N. Y. (see p's 37-38)

## REFINERIES IN ECUADOR—1957

| *Name of Company* | *Plant Location* | *Crude Capacity* | *Type Plant* | *Cracking Capacity* |
|---|---|---|---|---|
| Anglo-Ecuadorian Oilfields Ltd. | La Libertad [1] | 5,200 | S | — |
| Manabi Exploration Co. | Cautivo | 450 | S | — |
| | Total | 5,650 | | |

[1] 7,700 b/d distillation unit and 6,000 b/d UOP thermal cracker planned for completion July 1958.

Capacities are in barrels per day. Key to type of plant: S—skimming. All data as of December 1, 1957.



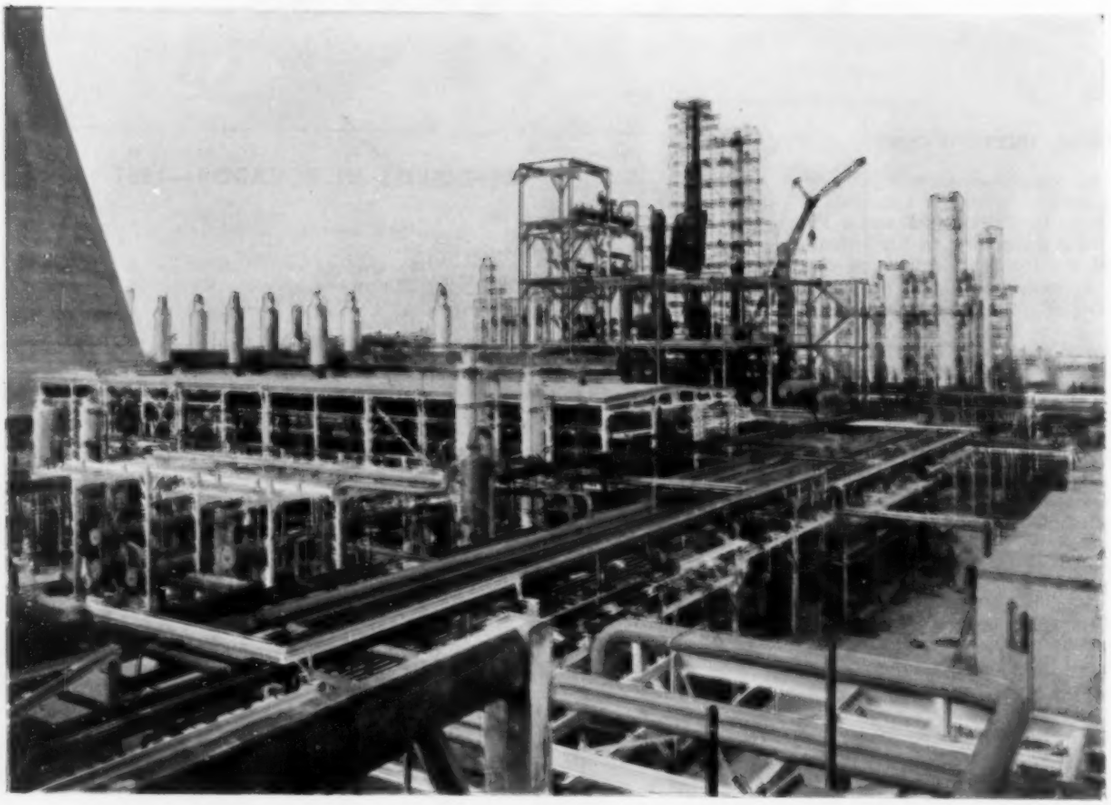

## Ecuador

World Petroleum Report Concession Map

(Data as of March 1957)

LEGEND

| NO. | COMPANY | AREA (Hectares) |
|---|---|---|
| 1 | Leonard Exploration Co. | 10,300,000.00 |
| 2 | Producing Zone — Various Companies | 114,426.38 |
| 3 | California Ecuador Petr. Co. | 1,731,539.00 |
| 4 | Manabi Exploration Company | 875,603.14 |
| 5 | Manabi Exploration Company | 19,881.00 |
| 6 | John K. Williams | 14,400.00 |
| 7 | Alberto Puig Aresemena | 3,625.00 |
| 8 | Dr. Pedro Host Y Luis Albizuri | 6,564.00 |
| 9 | Otto Carbo | 6,820.00 |
| 10 | Minas C. A. | 145,000.00 |
| 11 | Mc. Cauley | 125,002.00 |
| 12 | Adrian Jaramillo & Dr. Larco Rueda | 1,464,300.00 |
| 13 | Julio Sanchez De Plata | 49,600.00 |



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Coils, bends etc. from A.P.I. 5L and A.S.T.M. pipe

Butt-weld fittings to A.S.T.M. A 234 and A.S.A. B16.9 specifications

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# CHILE

## PHYSICAL DEVELOPMENT

**Exploration:** Principal news in Chilean exploration was extension of ENAP (Empresa Nacional de Petroleo) activities to the northern province of Tarapaca. Preliminary surveys made during 1956 were followed by gravimetric and seismic work. A total of about $1.5 million is to be spent on this area between now and the end of 1958. The Corporacion de Fomento, of which ENAP is a subsidiary, is providing funds. Until now, exploration in Chile has been confined to the southern province of Magallanes, and to Tierra del Fuego.

**CHILE—DRILLING STATISTICS**
(1st 10 Months 1957)

| Well | Oil | Gas | Dry | Total |
|---|---|---|---|---|
| Exploration | 2 | 1 | 11 | 14 |
| Extension | 2 | 3 | 6 | 11 |
| Development | 15 | 5 | 9 | 29 |
| | 19 | 9 | 26 | 54 |

**CHILE—DRILLING**
(1st 10 Months 1957)

| | Meters |
|---|---|
| Exploration | 35,365.0 |
| Extension | 24,238.3 |
| Development | 62,028.0 |
| | 121,631.3 |

**CHILE—MAGALLANES DRILLING DATA 1957**
(1st 10 Months)

| | Oil | Gas | Dry | Total |
|---|---|---|---|---|
| Exploration | 12 | 17 | 65 | 94 |
| Extension | 19 | 17 | 41 | 77 |
| Development | 100 | 26 | 40 | 166 |
| | 131 | 60 | 146 | 337 |
| Wells abandoned in 1957 | | | | 3 |

Drilling was up during 1957—with a total of 19 oil wells, 9 gas wells, and 26 dry holes completed during the first 10 months, compared with 18, 16, 30 during all of 1956.

**Production:** Production in Chile remained at about 10,800 b/d during the first quarter of 1957; thereafter it rose slowly to 11,300 b/d in the second quarter, and to about 12,900 b/d in the third quarter—for a yearly average of 11,700 b/d, compared with 9,500 b/d in 1956. Production during 1958 is expected to be at about the same level as in 1957.

**CHILE—CRUDE-OIL AND NATURAL-GAS PRODUCTION (1st 10 Months 1957)**
(Cubic Meters)

| Field | Oil | Gas | Gas Reinjected |
|---|---|---|---|
| Manantiales | 6,623.1 | 53,072,000 | 47,875,000 |
| Chañarcillo | 35,541.6 | 190,367,000 | 176,213,000 |
| Victoria | 100,893.2 | 214,437,000 | 83,271,000 |
| Sombrero | 131,299.2 | 49,793,000 | 69,944,000 |
| Chillán | 67,749.4 | 4,486,000 | — |
| Cullen | 178,786.6 | 17,062,000 | — |
| Flamenco | 16,667.8 | 41,230,000 | 27,618,000 |
| Varios | 21,864.9 | 73,560,000 | — |
| | 559,425.8 | 644,007,000 | 404,921,000 |

**Refining and Marketing:** The new Concon refinery in Chile is being expanded to 41,000 b/d capacity by 1959; but plans are to hold output to 33,000 b/d until 1963, when sufficient market will be available in the country. The plant—now operating at 20,000 b/d—turned out 6,363,428 bbl. of products in 1957. Octane rating of gasoline is 76, but this will rise to 78 with completion of refinery expansion, and to 85 octane for premium gasoline.

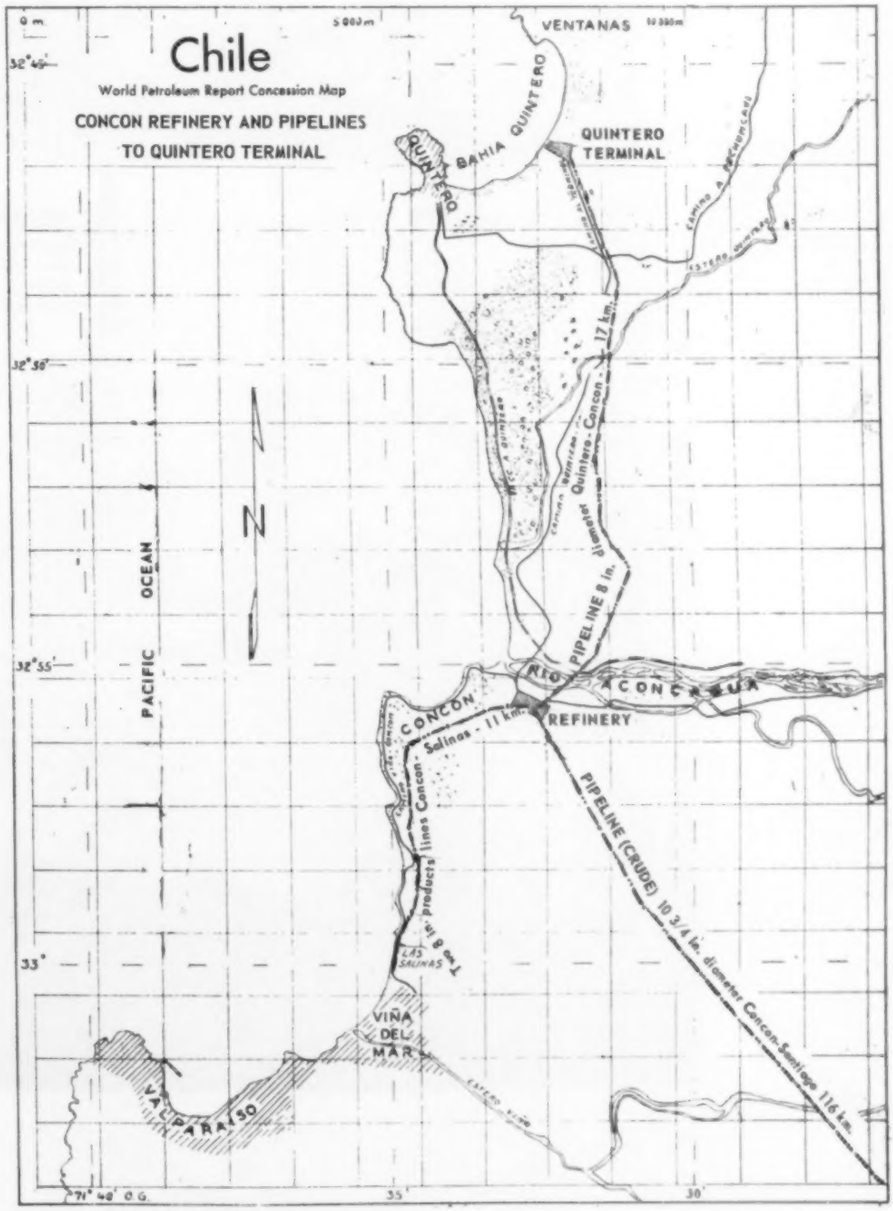
**PRODUCTION, MANANTIALES GAS PLANT**
(1st 10 Months 1957)
(Cubic Meters)

| | |
|---|---|
| Propane | 26,847.5 |
| Butane | 19,014.7 |
| Natural gasoline | 15,751.9 |
| Topped gasoline | 11,138.7 |
| Kerosine | 1,551.1 |
| Diesel fuel | 10,349.7 |

**CHILE—GAS PRODUCTION**
(Cubic Meters)

| | Production | Reinjection |
|---|---|---|
| 1956 4th Qtr. | 173,122,000 | 113,204,000 |
| 3rd Qtr. | 159,355,000 | 86,587,000 |
| 2nd Qtr. | 133,924,000 | 60,507,000 |
| 1st Qtr. | 120,757,000 | 75,454,000 |

According to ENAP, a 24,000 b/d distillation unit will be added, plus substantial cracking capacity. Recently the company was considering an expansion plan to include a distillation unit, a 9,600 b/d vacuum distillation unit and 11,000 b/d fluid catalytic cracker, a 600 b/d catalytic reformer, and a 2,000 b/d alkylation unit.



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Chile is planning a new 75-mile 10-in. product pipeline from the Concon refinery to inland markets. Initial capacity, with one pumping station at Concon, will be 30,000 b/d. The line will be owned by Esso Standard Oil Co. (Chile), 26%; Cia. de Petroleos de Chile (Copec), a private marketer; and ENAP, 26%. Copec would hold 48%. Operating capital of the new company would be 1.5 billion pesos.

ENAP will also build a 44 mmcf gas plant and a crude stabilization plant in Manantiales field in Tierra del Fuego.

## Oil Law Summary

Subsoil reserved to State. Proposed law covers all activities, exploration through marketing. Operating companies must be domiciled in Chile. Surrender and transfer any oil right subject to government authorization. Foreign governments and their companies, officials of Chilean government, may not hold concessions. Regulations not yet drafted, but may specifically not be more burdensome than the law (Art. 10). On exploration, all equipment reverts to government. Permanent installations may be purchased by government.

Magallanes province reserved for government operation (Art. 17). Covers area between parallels 52 and 56 degrees. (Revised draft during December 1957 omitted this reservation of Magallanes to government.)

**EXPLORATION:** All applications submitted within 100 days of law's publication considered simultaneous. **Area:** 123,500 acres per concession. Maximum 10 concessions per concessionaire. **Duration:** 4 years. One extension grantable for 2 years more. **Work Obligation:** Begin work within 6 months. Construct reference point for concession location within 6 months. **Minimum Investment:** Four gold pesos per hectare per year. During extension, 6 gold pesos yearly per hectare. **Regulatory Agency:** Department of Mines and Combustibles. **Surface Tax:** 0.25 gold peso per hectare per year. **Guaranty Deposit:** One gold peso per hectare. During extension, surface tax rises to 0.50 gold peso per hectare yearly.

**EXPLOITATION:** Exploration concession confers guaranteed right to exploitation concession on same area. Covers all activities of production through marketing. **Area:** 61,750 acres per concession. No maximum per concessionaire. **Duration:** 30 years. Renewable for 10 years. **Guaranty:** Ten times exploration guaranty. **Annual Surface Tax:** Rises from 0.75 gold peso per hectare during first 5 years to 2 gold pesos second 5 years, 6 gold pesos third 5 years, 8 gold pesos for 5 years, 6 gold pesos remaining duration and extension. **Drilling Obligation:** Minimum 10,000 meters per 100,000-hectare concession area within 5 years and 5,000 meters per each 25,000 hectares following 5 years. **Minimum Production:** 1 cubic meter (6.3 bbl.) petroleum per hectare yearly. **Income Tax:** 50% of net profits. Payable in US dollars. Payable on profits from all operations, production through marketing. Deductions include general administration expense, amortization, and other direct costs. Includes depletion allowance. **Depletion Allowance:** 15% gross production value, to maximum 50% net production value. **Royalty:** 12½%. Payable in US dollars. **Export:** No export tax may be levied. **Import:** No import duties payable. **Exchange Rate:** Operator must use free exchange rate. May repatriate freely profits on marketing within Chile at free exchange rate. May not export before internal consumption requirements of Chile are satisfied. **Government Income:** 60% government's oil income to be directed to government's oil-agency use; 40% to be used for incentive fund for employees of government, up to 50% of their salary. Remainder considered general government income.

## REFINERIES IN CHILE—1957

| *Name of Company* | *Plant Location* | *Crude Capacity* | *Type Plant* | *Cracking Capacity* |
|---|---|---|---|---|
| Johannsen, G. H. | Coquimbo | 125 | S | — |
| Maritano, Miguel | Talcahuano | 60 | S | — |
| Soc. Establecimientes Quimicos | Via del Mar | 175 | S | — |
| Empresa Nacional del Petroleo | Concon [1] | 20,000 | SC | 16,000T |
| | Total | 20,360 | | 16,000T |

[1] 4,600 b/d thermal reforming capacity to be revamped as 8,000 b/d crude unit. For 1959 completion construction includes 30,000 b/d added topping, 12,000 b/d cat. cracking and 6,000 b/d cat. reforming.

Capacities are in barrels per day. Key to type of plant: S—skimming; C—cracking. Under cracking capacity to indicate type: T—thermal. All data as of December 1, 1957.

Chile has ceased to be an exporter of oil, and now delivers all its production to the large refinery at Concon. There is also a considerable amount of oil import, which rose during 1956 by more than 60%, to 3,659,100 bbl. Most of this crude comes from Venezuela—with some very small amounts from Chile and Argentina.

however, which affect Chile's favorability. These include government instability, which has been chronic in recent years, and extreme monetary instability. The latter was corrected to some degree with the currency reform of April 16, 1956. It created the new rates for the Chilean currency which consists at present of

### CHILE—PRODUCTION AND DRILLING DATA

| Field | Year Discovered | Number of Wells Flowing, 1957 | Number of Wells Pumping, 1957 | Depth (Feet) | API Gravity | Production (Cubic Meters Per Day) (1st 10 Months) 1956 | 1957 |
|---|---|---|---|---|---|---|---|
| Manantiales | 1945 | 26 | — | 7,500 | 42 | 40 | 21 |
| Chañarcillo | 1950 | 9 | — | 7,600 | 46 | 100 | 116 |
| Victoria | 1950 | 33 | — | 7,500 | 42 | 314 | 331 |
| Sombrero | 1950 | 20 | — | 7,500 | 42 | 415 | 431 |
| Chillán | 1953 | 17 | — | 7,600 | 41 | 225 | 222 |
| Cullen | 1954 | 45 | — | 6,000 | 42 | 370 | 588 |
| Flamenco | 1954 | 9 | — | 6,500 | 42 | 41 | 54 |
| Calafate | 1955 | 6 | — | 6,000 | 42 | 31 | 17 |
| Vertientes | 1956 | 3 | — | 7,500 | | 4 | 39 |
| Gaviota | 1957 | 1 | — | 7,200 | | | 17 |
| Tres Lagos | 1957 | 1 | — | 6,000 | | | 16 |
| P. Delgada | 1952 | 5 | — | 7,600 | 39 | | |
| Espora | 1949 | 1 | — | 7,500 | 46 | | |
| Manzano | 1953 | | | 4,000-5,000 | | | |
| Catalina | 1956 | 4 | — | 6,500 | | | |
| Primavera | 1954 | | | 7,600 | | | |

Note: In this table some fields of minor importance, and with only one producing well have been omitted.

### OIL LAWS

Exploration in Chile has been reserved to the government since about 1926. Recently there has been considerable agitation for a new oil law which would permit development of the country by private foreign interests. Until late in 1957, all of these proposals reserved the extreme southern tip of Chile, the Magallanes area, for the government. During November 1957, the House of Deputies Mining Committee revised the oil bill to allow ENAP to grant subconcessions to private foreign investors.

### NATIONAL FACTORS

Principal drawback to Chilean investment has been Chile's oil law, which shows signs of being modified. There are other factors,

two rates: an official rate of 560 pesos per dollar, and a rate for payment of tourist receipts and capital transfers from and into Chile of 610 pesos per dollar. While stability of the currency has been good in recent months, the peso remains subject to fluctuations caused by political trouble.

Although the attitude toward petroleum is very nationalistic, the general attitude toward foreign investment is liberal. As covered in *World Petroleum Report 1957*, a recent decree-law facilitates foreign investment, and provides for transfer of profits, repatriation of capital, and tax exemption for 10 years on new investment—plus customs and other import exemptions on new industries. END

### CHILE—REFINING AND MARKETING
(Barrels)

| | IMPORTS | | | EXPORTS | | REFINERY RUNS | | |
|---|---|---|---|---|---|---|---|---|
| | 1957 | 1956 | 1955 | 1957 | 1956 | 1957* | 1956 | 1955 |
| Crude oil | 2,534,719 | 3,659,100 | 2,092,600 | 365,905 | 121,784 | 5,709,049 | 6,534,820 | 4,646,266 |
| Fuel oil | | | 4,715,788 | | | 1,682,795 | 1,038,157 | 1,659,302 |
| Diesel oil | | | 963,923 | | | 1,078,672 | 1,160,700 | 640,322 |
| Kerosine | | | 1,193,261 | | | 153,526 | 151,024 | 106,930 |
| Motor gasoline | | | 1,671,225 | | | 2,503,835 | 2,899,670 | 1,747,362 |
| Lubricating oil | | | 143,348 | | | | | |
| Others | | | 75,144 | | | 77,763 | 1,116,324 | |
| Totals | 2,534,719 | 3,659,100 | 10,855,289 | 365,905 | 121,784 | 5,496,591 | 6,365,885 | 4,153,916 |

NOTE: Most crude is sent to Concón refinery. In 1956 Concón crude deliveries were 3,408,250 bbl. 54% represented domestic production; the balance imported from Venezuela.
*January 1 to October 31.

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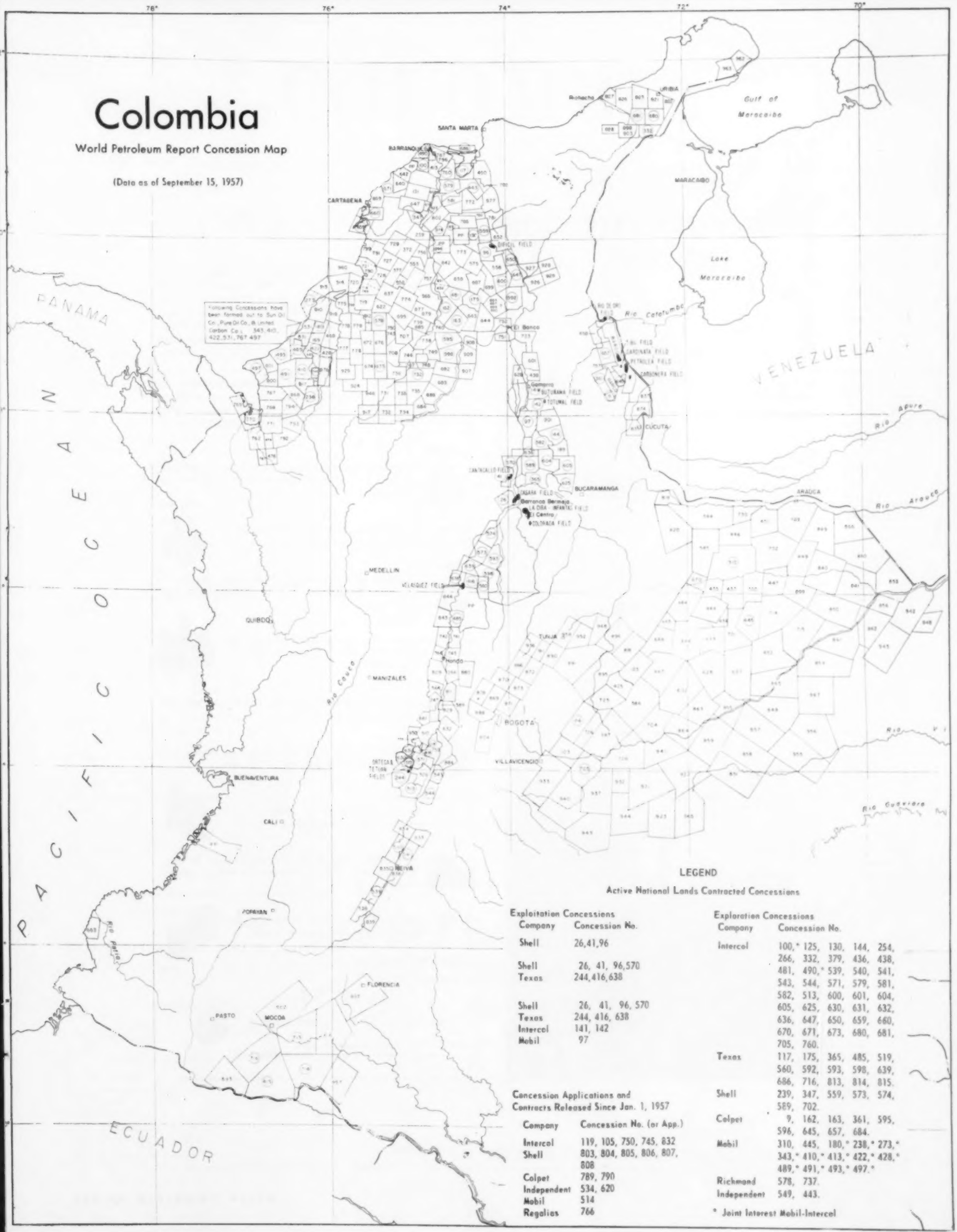
# Colombia

World Petroleum Report Concession Map

(Data as of September 15, 1957)




## LEGEND

Active National Lands Contracted Concessions

### Exploitation Concessions

| Company | Concession No. |
|---|---|
| Shell | 26,41,96 |
| Shell | 26, 41, 96,570 |
| Texas | 244,416,638 |
| Shell | 26, 41, 96, 570 |
| Texas | 244, 416, 638 |
| Intercol | 141, 142 |
| Mobil | 97 |

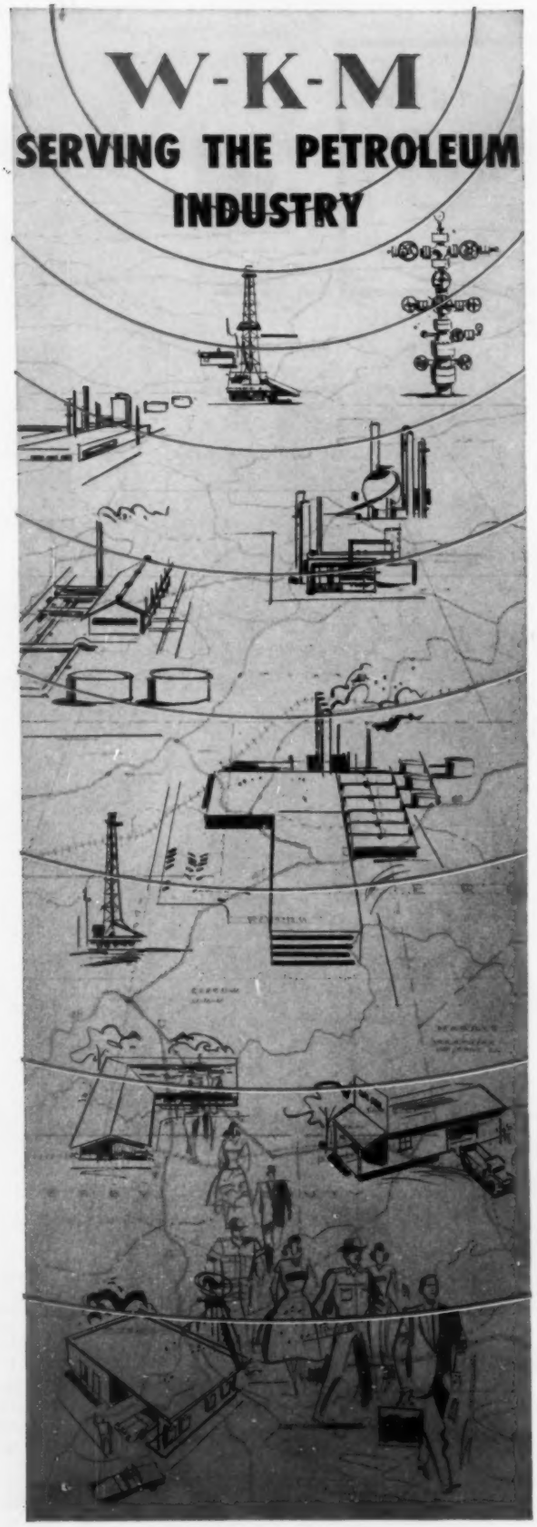
### Concession Applications and Contracts Released Since Jan. 1, 1957

| Company | Concession No. (or App.) |
|---|---|
| Intercol | 119, 105, 750, 745, 832 |
| Shell | 803, 804, 805, 806, 807, 808 |
| Colpet | 789, 790 |
| Independent | 534, 620 |
| Mobil | 514 |
| Regalias | 766 |

### Exploration Concessions

| Company | Concession No. |
|---|---|
| Intercol | 100,* 125, 130, 144, 254, 266, 332, 379, 436, 438, 481, 490,* 539, 540, 541, 543, 544, 571, 579, 581, 582, 513, 600, 601, 604, 605, 625, 630, 631, 632, 636, 647, 650, 659, 660, 670, 671, 673, 680, 681, 705, 760. |
| Texas | 117, 175, 365, 485, 519, 560, 592, 593, 598, 639, 686, 716, 813, 814, 815. |
| Shell | 239, 347, 559, 573, 574, 589, 702. |
| Colpet | 9, 162, 163, 361, 595, 596, 645, 657, 684. |
| Mobil | 310, 445, 180,* 238,* 273,* 343,* 410,* 413,* 422,* 428,* 489,* 491,* 493,* 497.* |
| Richmond | 578, 737. |
| Independent | 549, 443. |

* Joint Interest Mobil-Intercol

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# COLOMBIA

## PHYSICAL DEVELOPMENT

**Exploration:** Activities are at a new peak—with about 15 wildcat drilling rigs operating. A major development during 1957 was the discovery of Gualanday No. 3 in the upper Magdalena valley by International Petroleum Co.'s subsidiary, Intercol. The well, on a three-day test, flowed 840 b/d of 38 API crude on a 5/8-in. choke. It is 15 miles west of Giradot and 75 miles southwest of Bogota.

The Magdalena valley has always been the center of importance, and nothing has been found of importance outside it. Cities Service is drilling there in the Carare region, within the De Mares property, under a joint venture with the government's company, Ecopetrol, described in *World Petroleum Report 1957*. A deep test is drilling at Chucuri by Cities Service—with no results announced as yet.

Forest Oil Corp. is carrying out its water-injection scheme described in *WPR 1957*, which may extend to Las Infantas field later.

The inaccessible llanos, immense but remote plains of the southeast, were favored by special legislation. The region is being studied, but no drilling is under way. A seismic survey is being done by Intercol.

On the Caribbean coast, John W. Mecom, Texas independent, abandoned his 25-75 agreement with Ecopetrol. He had completed a gravity survey recently, and shipped in a rig at considerable cost through An-Son contractors. Title difficulties were reportedly the cause. Mobil-Intercol is drilling Cordoba No. 1 with a 15,000-ft. rig.

In the Sinu River valley, near the Caribbean, Colombia Sun Oil Co. made a joint-venture arrangement with Socony and International for 50% interest in 750,000 acres for drilling two wells to a total depth of 18,000 ft. Pure Oil Co. and United Carbon, both USA companies, are associated with Sun in the venture. Sun is also committed to drill near Cartagena for a 50% interest in a farmout from Intercol.

The first oil well in eight years to be drilled on the Guajira peninsula was scheduled to be spudded by International Petroleum (Colombia) Ltd. in the early weeks of 1958, near Carraipia in the southwest of the peninsula.

Colombian Petroleum Co. made its Cicuco discovery during the year 1956—No. 1 reaching basement at 8,115 ft.; and the sixth well drilled, which is No. 4, has tested as much as 1,500 b/d, and is reported good for 4,000 b/d. As of January 1957, the field was placed on production for test, yielding 110 b/d; and by August, with additional wells, it was making 733 b/d—so that the latest completion, No. 4 well, practically triples the oil output of this discovery of 43 API oil. This concession is held by Colombian Petroleum Co., owned by Mobil-Texas 50-50.

Going upstream along the Magdalena River at No. 36, Shell is reported to have brought in Las Garzas wildcat on test for some few hundred barrels daily; having drilled it to 10,012 ft. Just north of this location, Intercol completed at No. 35 its Mata 1, having drilled it to 9,663 ft., as a noncommercial producer.

**Production:** Production rose substantially in 1956—for the first time in five years—and rose again in 1957. The rise was primarily due to the higher output from the Velasquez field, owned by the Texas Co. in fee. The Palagua field, a northwestward extension, is being brought in with about 24 wells in production at about 4,700 b/d. The Yarigui field of Shell-Canadian Eagle now is up to about 8,500 b/d—with the 12th well being completed. Some wells in the field can produce 4,000 b/d—highest rate in Colombia. Only other field showing an increase is Cicuco of Colpet, up to about 750 b/d. The other fields of Colombia are old and declining rapidly.

**Refining:** The principal development during 1957 was International's Cartagena refinery on the Caribbean coast, which went onstream late in 1957. It has 26,500 b/d crude capacity in an atmospheric and vacuum pipe still which produces light and heavy virgin naphtha, distillate fuel, gas oils for cracking, and vacuum residua. A fluid catalytic-cracking unit of 13,130 b/d capacity is included, plus a non-selective catalytic polymerization unit with a 3,600 b/d charge of the $C_3$ and $C_4$ streams. It brings Colombia's capacity to 71,200 b/d, with 44,760 cracking, and exceeds domestic consumption demands.

**Marketing:** Consumption reached a peak in 1956, and for the first time in the post-World War II period began to decline in 1957. The decline was about 4% in the first half; this was due to higher peso price of products, reduced trucking, and restriction of motor-vehicle imports.

## OIL LAWS

No changes occurred in 1957 in laws governing exploration and exploitation in Colombia, as contained in the accompanying table. The investment climate of the country has been considerably improved by the passage of legislation several years ago providing new incentives to investment, particularly in the inaccessible llanos region. Its impact was felt immediately in increased exploration there, and a higher production level generally.

## NATIONAL FACTORS

Colombia's attitude toward foreign capital investment has been traditionally favorable. It improved during 1957 with the freeing of the peso. Oil companies are now allowed to acquire pesos for expenditure in the country at 20 US cents each, compared with the old official rate of 40 US cents—which was highly artificial.

A governmental change occurred during the year when a military junta, headed by Major General Gabriel Paris, deposed President Rojas in May.

## Oil Law Summary★

**EXPLORATION: Duration:** Reconnaissance free on public lands. Exploration concession, 5 yrs. initial in western Colombia, 7 yrs. initial in eastern Colombia. One "ordinary" and one "extraordinary" extension, each for 3 yrs. possible in either. **Area:** Max. per concession, 137,050 acres in west; 548,200 in east. No limit per concessionaire. **Ownership:** Colombian companies only. No stock ownership restrictions. **Surrender:** Any time with govt. permission. **Drilling Obligation:** 2 wells during "ordinary" extension in west, 1 well during "extraordinary" extension in east. **Conversion to Exploitation:** Exploration contract not granted separate from exploitation, therefore conversion guaranteed. **Taxes:** 2 US cents per acre 1st year, rising to 8 US cents per acre in 8th year, 31.34 US cents per acre thereafter. Reduced ½ while exploratory drilling in progress.

**EXPLOITATION: Duration:** In eastern Colombia, 30 yrs., with one 10-yr. extension possible; western, 50 yrs., with one possible 20-yr. extension. **Area:** Not fixed (presumed within limits of explrn.-expltn. contract.) **Surrender:** Any time with govt. consent. **Bond:** Guarantee bond 16 US cents per acre—with min. bond $10,000. **Royalty:** On private lands in eastern Colombia, 3% minus field use; in western varies from 7% on production within 62 mi. of coast to 0.5% over 559 mi. from coast. On govt. lands, from 13% to 3% according to pipeline distance from coast. Offshore, flat 10%. **Income Tax:** Not to exceed 50% of net. Exempt from any export tax. **Profit Remittance:** Guaranteed on % earnings. **Depletion Allowance:** 10% gross income to 35% net in west, 27½% gross to 50% net in east.

★Taken from *World Petroleum Legislation*, 604 Fifth Ave., N. Y. 20, N. Y. (see p's 37-38)

**COLOMBIA—WELL DATA**

| | To Sept. 22 1957 | 1956 |
|---|---|---|
| Exploratory (including outpost) wells drilled: | 11 | 18 |
| Oil producers | | 4 |
| Gas producers | | 1 |
| Dry | | 13 |
| Development (including extension) wells drilled: | 15 | 108 |
| Oil producers | | 91 |
| Gas producers | | 0 |
| Dry | | 17 |
| Total Explr. and Develop. | 26 | 126 |
| Footage drilled: | | 815,479 |
| Drilling rigs in service: | 41 | |
| Exploratory | 9 | |
| Development* | 32* | |
| Totals wells pumping, end of year | | 1,708 |
| Total wells flowing, end of year | | 179 |

*Includes 15 field, 17 service.

**REFINERIES IN COLOMBIA—1957**

| *Name of Company* | *Plant Location* | *Crude Capacity* | *Type Plant* | *Cracking Capacity* |
|---|---|---|---|---|
| International Pet. | Tibu | 8,000 | S | — |
| Colombian Petroleum Co. | Barranca Bermeja | 37,500 | Comp | 31,630CT |
| (Colombia) Ltd. | Cartagena | 27,500 | SC | 13,130C |
| | La Dorada | 5,000 | S | — |
| The Texas Petroleum Co. | Guamo | 1,200 | | |
| | Total | 79,200 | | 44,760TC |

Capacities are in barrels per day. Key to type of plant: S—skimming; C—cracking; Comp.—complete. Under cracking capacity to indicate type: T—thermal; C—catalytic.

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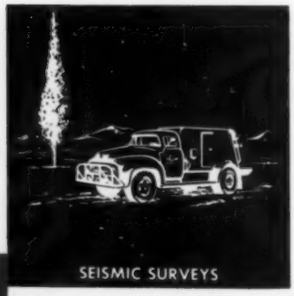
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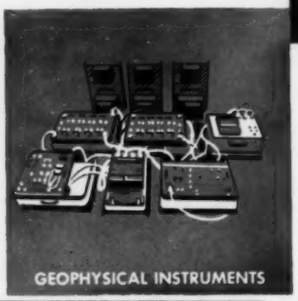
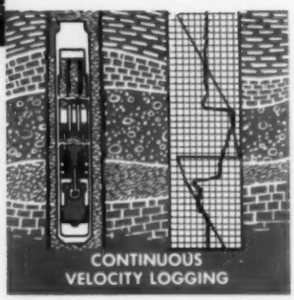

GEOPHYSICAL INSTRUMENTS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# VENEZUELA

## PHYSICAL DEVELOPMENT

**Exploration:** Exploration in Venezuela is more active than it has been for the past decade. With granting of new concessions late in 1956 and early in 1957 (February), some 2,029,426 acres were added to the total 14.6 million already under concession at the beginning of 1956. Because of the high bonuses paid for many of these concessions as part of their initial acquisition cost, development on them has gone forward rapidly.

Generally, exploration is centering around three principal areas, viz., Lake Maracaibo, Gulf of Paria, and in the extreme west of Venezuela along the Colombian border.

**VENEZUELA—GEOLOGICAL AND GEOPHYSICAL EXPLORATION (Party-Months)**

| | 1957 (1st 10 Mos.) | 1956 | 1955 |
|---|---|---|---|
| Seismograph | 197.5 | 181 | 203 |
| Surface geology | 94 | 123 | 152 |
| Gravimeter | 40.5 | 36 | 31 |
| Stratigraphic test | 30 | 32 | 6 |
| Air-magnetometer | 2 | 9.5 | 2 |
| Scintillometer | — | 5 | — |
| Structure or core drill | 1 | 3.5 | 18 |
| Geochemical | 2.5 | 0.5 | — |
| Total | 367.5 | 390.5 | 412 |

*Lake Maracaibo:* Superior Oil Co. scored the most spectacular successes in Lake Maracaibo during 1957. It paid $2,833 per acre for 7,773 acres in the middle of the lake, and began drilling in June. Superior's first well, No. 1 Lama—located in the northeast corner of its concession—found 313 ft. of oil sands in the C4X and C5X Eocene series. The well went to about 8,000 ft. With 9⅝ in. casing set at 7,982 ft., the well was completed in a 65-ft. section of the C4X from 7,425 ft. to 7,490 ft., and in a 105-ft. section of C5X from 7,652 ft. to 7,757 ft. It tested 5,000 b/d through a ¾-in. choke. The second well, No. 5 Lama—located 2½ miles south of No. 1—logged 350 ft. of oil sands in Eocene between 7,400 ft. and 8,000 ft. Two more wells, No. 6 and No. 7 Lama, soon followed to complete tests on this western half of Group 75 area. No. 5 and No. 6 tested about 7,000 b/d on a ¾-in. choke. Superior promptly drilled an outpost to No. 2. The latter well was at 8,607 ft. in mid-November and still drilling. Lama No. 7 intercepted 500 ft. of oil-saturated sand in the Eocene between 7,000 ft. and 9,000 ft. Altogether, these lake discoveries indicated a lucrative oil find. However, Superior's initial investment in this lease has been about $30 million—including about $22 million in bonus cost, plus cash outlay for predrilling expenses. Wildcat drilling probably cost around $5 million more, since wells in this region cost about $1 million each and must produce at least 200 b/d to be commercial. Loffland Bros. have been doing the work. Superior now has six platforms built, and plans to add more rigs.

A second major discovery was made in the lake by Venezuelan Sun Co.—operating for itself, Seaboard Oil, and Atlantic Refining. Sun's first well, No. 1 SVSX, went to 13,700 ft., and discovered some 500 b/d production in the Cretaceous from 11,050 ft. to 11,074 ft. A second test, No. 2 Timoteo—on E-574 tract acquired by the company during 1956—was being drilled late in 1957, with results unknown. The well initially tested about 480 b/d of 36 API crude through a ⅜-in. choke.

Early in December, Venezuelan Sun made an important discovery when it completed No. 5 SVXS on the 24,710-acre tract—testing 7,080 b/d of 32 API crude through a ¾-in. choke from a 100-ft. section of Eocene between 9,470 ft. and 9,570 ft. With about 900 ft. of productive sands, the well's total depth is 9,693 ft. Production from No. 1 SVXS is small by lake standards, but No. 5 ranks with Superior's best discoveries in the national reserve bordering Lake Maracaibo's Block 1 to the north. Seaboard owns 10% in these ventures—with the rest divided equally between the other two participants.

In the first week of January 1958 the Sun-Atlantic-Seaboard group completed another major well in its Block 1 acreage—about one mile east-southeast of No. 5 SVXS. The new well, SVS-4, tested 6,063 b/d of 31.6 API crude through a ¼-in. choke—from perforations in a 98-ft. section of basal Eocene from 9,484 ft. to 9,582 ft. Bottomed at 9,687 ft., SVS-4 encountered about 1,300 ft. of oil-bearing sand.

Signal Exploration Co. spudded an exploratory well in Lake Maracaibo during mid-1957, No. 1-X Centro Lago. Though abandoned at 9,470 ft., some oil shows had been found. Signal made a later major discovery, Centro 2X, which flowed 2,400 b/d of 40 API crude through a ⅝-in. choke—during October 1957. It was tested for three hours at an interval from 12,113 ft. to 12,183 ft. Signal plans to move the platform a mile northwest for a third well, and may now move back and retest its first exploratory well. Signal reported that, besides the 70-ft. pay in the 12,000-ft. level, about 350 ft. of additional zones were encountered at shallower depths. These included a 40- to 50-ft.-thick sand in either the Icotea or center Barbara formation at around 9,000 ft., and about 120 ft. of oil-saturated sand in the B-6 zone starting at 9,100 ft. Pure, Standard (Ohio), and Hancock Oil are partners in this venture.

Mene Grande Oil Co.—which stimulated interest in Lake Maracaibo with its No. 1 Ceuta wildcat discovery late in 1956—has completed two more producers in the area, and has two more rigs running. Mene has an exceptionally good concession position—with areas spaced almost entirely across the new acreage in Lake Maracaibo. The company paid $137 million for a total 127,000 acres. Currently, it is testing this new acreage—with no new discoveries reported as yet.

Phillips Petroleum Co. spudded exploratory well No. LPG-1-1 on Block 17 in the northwest corner. In 100 ft. of water, the well is farthest west of any yet drilled in Lake Maracaibo. Phillips owns 55.75% of this concession area, and is operator of an eight-company group including Kerr-McGee, Sunray, Mid-Continent Oil Co., Ashland Oil & Refining, Western Natural Gas, El Paso Natural Gas, Pacific Petroleums Ltd., and Canadian Atlantic Oil Co. Ltd. In mid-November, the well was at 10,794 ft.—with no shows reported and still drilling. On Block 10—directly east of Shell's Block 7—Phillips is 45% owner and operator. 25% of the concession is owned by San Jacinto & Associates; 10% by El Paso Natural Gas Products Co.; 10% by Western Natural Gas; 5% by Pacific Petroleums Ltd. The company has spudded exploratory well LSG-0-1, which was at 6,680 ft. and still drilling as of mid-November. Kermack Drilling Co. is contractor.

Cia. Shell de Venezuela is drilling two deep tests. One—ELE 196-X, in the northwest section of Block 7—was testing at 13,038 ft. in mid-November. The second test is located about 12 miles southeast of the first. This well, VLE 198-X, was at 12,291 ft. in mid-November and still drilling. ELE 196-X, the first well, was an announced producer of 25 API crude. Production figures were not given.

A seven-company group, headed by San Jacinto Petroleum Corp., drilled into about 125 ft. of lower Miocene pay (missing in Mene's discovery)—below 11,000 ft. during mid-1957. This well, Marlago No. 1, was completed at 13,332 ft.—testing the Eocene. Early in December, it came in flowing 5,760 b/d of 27.1 API crude through a ¾-in. choke—with tub-

**1956-1957 VENEZUELAN CONCESSION AWARDS**
**(By types, zones, years)**

I. EXPLOITATION ACREAGE (for immediate development; 100% retained)

| Zone | Year | Hectares | Bolivares | Avg. Bs/Hec | Acres | Dollars | Avg. $/Acre |
|---|---|---|---|---|---|---|---|
| Lake Maracaibo | 1956 | 111,713.65 | Bs 945,721,131 | 8,465 | 276,044 | $306,058,618 | $1,109 |
| " " | 1957 | 30,000.00 | 351,000,000 | 11,700 | 74,130 | 113,592,233 | 1,532 |
| Gulf of Paria | " | 88,307.00 | 385,923,492 | 4,370 | 218,207 | 124,894,334 | 572 |
| South Monagas | " | 69,650.00 | 195,314,153 | 2,804 | 172,105 | 63,208,464 | 367 |
| Barinas | " | 11,276.86 | 67,786,047 | 6,011 | 27,865 | 21,937,232 | 787 |
| | | 310,947.51 | 1,945,744,923 | 6,257 | 768,351 | 629,690,881 | 820 |

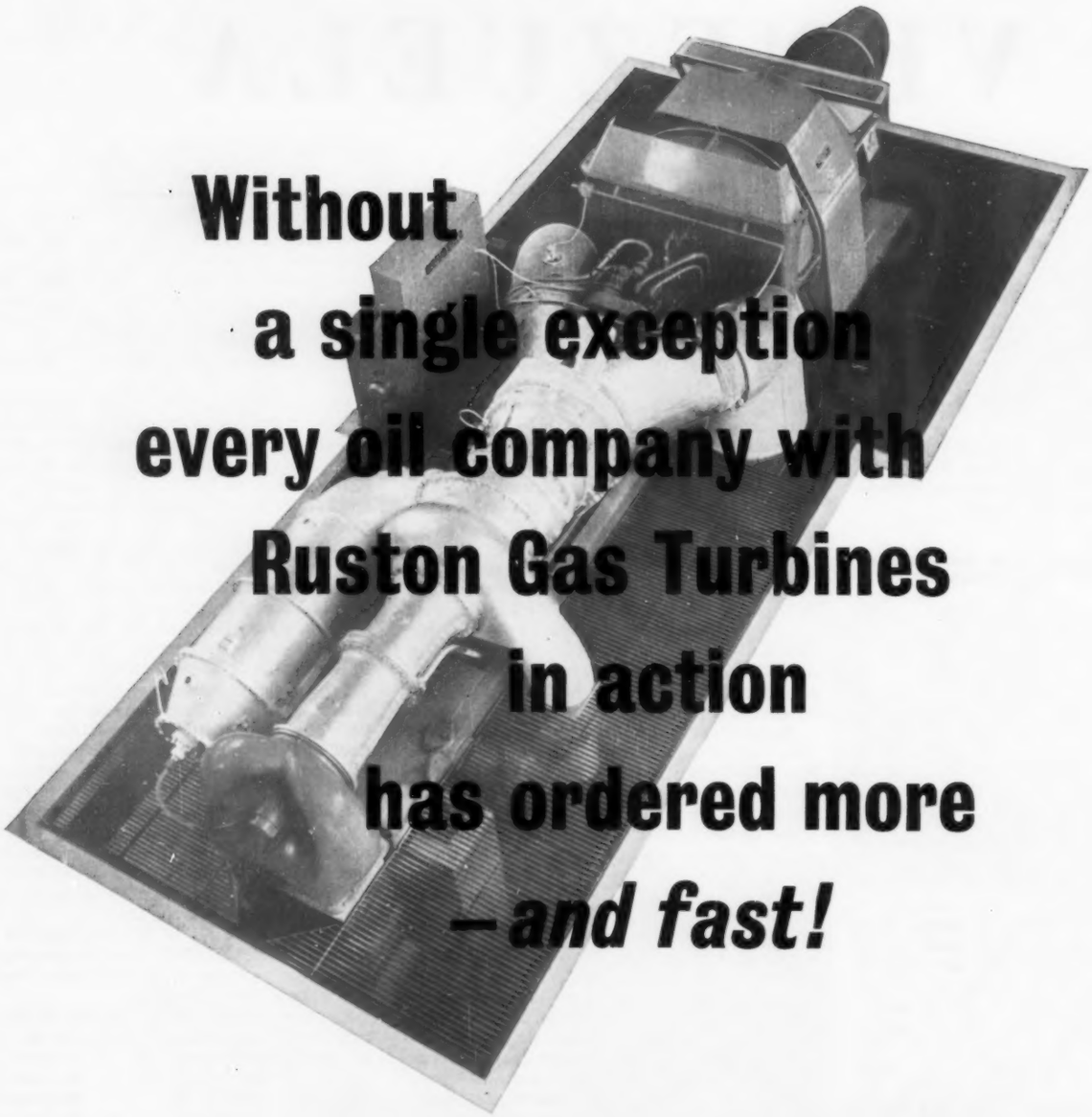
II. EXPLORATION ACREAGE, NON-BORDER (exploration period up to 3 years; 50% retained)

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Barinas | 1957 | 121,540.00 | 70,370,000 | 579 | 300,325 | 22,773,463 | 76 |
| N. Monagas | " | 29,320.00 | 47,058,600 | 1,605 | 72,450 | 15,229,320 | 210 |
| | | 150,860.00 | 117,428,600 | 778 | 372,775 | 38,002,783 | 102 |

III. EXPLORATION ACREAGE, BORDER (obligatory; in Apure, Táchira, and Zulia)

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | 1956 | 199,550.00 | 30,171,250 | 151 | 493,088 | 9,764,159 | 20 |
| | 1957 | 159,940.00 | 23,991,000 | 150 | 395,212 | 7,764,077 | 20 |
| | | 359,490.00 | 54,162,250 | 151 | 888,300 | 17,528,236 | 20 |
| GRAND TOTALS | | 821,297.51 | Bs 2,117,335,673 | 2,578 | 2,029,426 | $685,221,900 | 338 |

Source: VOSA summary, Oct. 22, 1957.



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ing pressure of 900 psi. Production is from 11,240 ft. to 11,296 ft. in the lower Miocene.

San Jacinto obtained this tract of 2,000 acres (V575) from Venezuelan Leaseholds CA, under an agreement whereby Venezuelan Leaseholds would obtain a share in the profits after costs of the concession's operating expenses had been paid off. San Jacinto also took a $490,000 exploration concession on the Colombian border. Venezuelan Leaseholds originally gave $3,890,000 for the Lake block in which San Jacinto now holds about a 70% share. The remaining 30% is divided among Tennessee Gas Transmission Corp., Union Oil & Gas Corp. of Louisiana, Murphy Corp., and Lion Oil Co. San Jacinto Petroleum Corp. obtained its 70% share after a stock deal whereby Venezuelan Leaseholds' share of the concession was traded for San Jacinto stock.

*Western Venezuela:* Considerable acreage was taken in the western part of Venezuela because of the concomitant obligation of companies obtaining concessions in known producing areas such as Lake Maracaibo. A recent discovery in the West was made by Colon Development Co. Ltd., a Royal Dutch-Shell subsidiary, in a deep well near the Colombia border. This well, CR.4, tested about 2,000 b/d, and is a Cretaceous producer of 39 API crude —with a low gas-oil ratio—from 14,118 ft. to 14,197 ft. Located about 50 miles due west of the southern tip of Lake Maracaibo.

*Gulf of Paria:* Drilling in the Gulf of Paria —long regarded a favorable area for oil production—was stimulated by a discovery, Soldado No. 1, offshore from Trinidad. $100 million was paid by a five-company group for a 152,000-acre concession offshore. Operator is Paria Operations Inc.—owned by Continental Oil Co., The Texas Co., and Ohio Oil each with 25%; Cities Service has 16-2/3%, and Richfield Oil Corp. 8-1/3%. Four drilling platforms have been moved into the area. The first well—begun in mid-October—is six miles offshore in 90 ft. of water—about 10 miles from Soldado, offshore discovery in Trinidad which stimulated interest in this area. Shows in a 30-ft. pay were reported in January, 1957.

*Others:* Atlantic Refining Co., under a farmout agreement with Seaboard Oil Co., successfully completed a wildcat in the Pedernales area of Venezuela late in 1957. Capure No. 2A, a joint test held in equal parts by the two companies, involved 36,500 acres. The new well flowed 300 b/d of 22 API crude. It had been drilled to a total depth of 5,364 ft., but formation difficulties prevented further drilling. After plugging, it was tested at the upper horizon—with final completion made at 1,848 ft. to 1,860 ft. Previously, Atlantic had drilled Capure No. 1 to 10,000 ft., and abandoned it as a dry hole. Capure No. 2 was abandoned at 3,152 ft. because of mechanical difficulties.

Venezuelan Atlantic Refining Co. earlier had discovered encouraging shows at Piritao No. 4. Side-wall cores indicated 18 API oil in a prospective 690-ft. pay section. On tests, however, the well flowed fresh water—with only small traces of oil.

In the Greater Oficina area, Venezuela Sinclair Oil Refining Co.'s discovery is shaping as a major discovery. A review of the initial discovery is contained in *World Petroleum Report 1957*. No. 3 Aguasay established the first important discovery since 1954 in the state of Monagas. The discovery was extended by Mene Grande's No. 1 Zulus which stretched the field's limits about 10 miles west during March 1957. Drilled to 13,200 ft., the well was completed for 1,225 b/d from 40-ft. and 15-ft. sections in the 12,000-ft. interval. Mene spudded another well, ZG-201-X 7, ½ mile west of No. 1 Zulus and 17½ miles west of discovery No. 3 Aguasay. Mene's well flowed 500 b/d 39.4-gravity crude through a ¼-in. choke, in a completion test on an 11-ft. section of U-2 sand, to a depth of about 12,000 ft. Sinclair believes that, on the basis of seismic surveys, the field may extend some 10 miles east from No. 3 Aguasay. (Mene's discoveries are located to the west.) These would give the field an extension of about 28 miles. Late in 1957, another producer was brought in, Caro No. 2, which tested 1,554 b/d 32-gravity crude, through a ¼-in. choke, at about 13,665 ft. It is near the original discovery. An upper zone, at about 12,600 ft., had been tested earlier. It had a potential of around 862 b/d through a 5/16-in. choke.

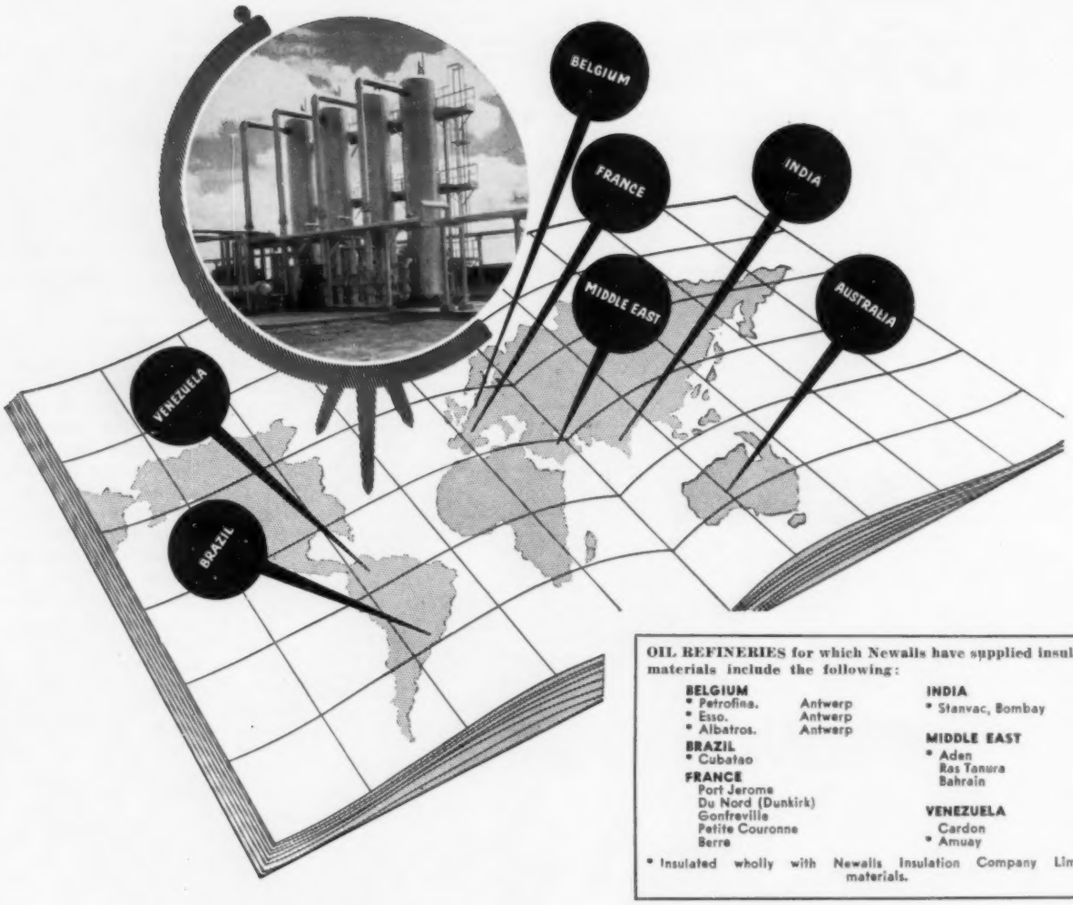
**1956-1957 CONCESSION AWARDS**

Summary by concessionaires (for partners, see "Divided Interests")

| Titleholder | | Type | Zone | Year | Acres | Dollars |
|---|---|---|---|---|---|---|
| MENE GRANDE | | Exploit. | Lake | 1956 | 126,845 | $134,471,718 |
| (Gulf) | | Oblig. | Border | " | 98,840 | 1,941,747 |
| | | | | | 225,685 | 136,413,365 |
| CONTINENTAL | (1) | Exploit. | Paria | 1957 | 152,004 | 101,637,699 |
| | (1) | Oblig. | Border | " | 98,840 | 1,941,747 |
| | | | | | 250,844 | 103,579,446 |
| SHELL | | Exploit. | Lake | 1956 | 59,607 | 66,956,320 |
| | | " | Paria | 1957 | 24,710 | 11,763,754 |
| | | Oblig. | Border | 1956 | 98,840 | 1,941,748 |
| | | | | | 183,157 | 80,661,822 |
| CREOLE | | Exploit. | Lake | 1956 | 25,444 | 24,999,383 |
| | | " | S. Monagas | 1957 | 77,332 | 19,661,961 |
| | | Explor. | Barinas | " | 197,680 | 15,080,906 |
| | | " | N. Monagas | " | 72,450 | 15,229,320 |
| | | Oblig. | Border | 1956 | 98,840 | 1,941,748 |
| | | | | | 471,746 | 76,913,318 |
| SAN JACINTO | (2) | Exploit. | Lake | 1956 | 1,969 | 3,873,787 |
| | (3) | " | Lake | 1957 | 24,710 | 48,543,689 |
| | (2) | Oblig. | Border | 1956 | 24,710 | 485,437 |
| | (3) | " | " | 1957 | 24,710 | 485,437 |
| | | | | | 76,099 | 53,388,350 |
| VEN. SUN | (4) | Exploit. | Lake | 1956 | 24,710 | 18,122,977 |
| | (5) | " | " | 1957 | 24,710 | 32,686,084 |
| | (4) | Oblig. | Border | 1956 | 24,710 | 485,437 |
| | (5) | " | " | 1957 | 24,710 | 485,437 |
| | | | | | 98,840 | 51,779,935 |
| PHILLIPS | (6) | Exploit. | Lake | 1957 | 24,710 | 32,362,460 |
| | (6) | " | S. Monagas | " | 24,710 | 11,362,460 |
| | (6) | Oblig. | Border | " | 49,420 | 970,873 |
| | | | | | 98,840 | 44,695,793 |
| PAN VENEZUELAN | | Exploit. | Paria | 1957 | 22,264 | 4,665,372 |
| (Stanolind) | (7) | " | S. Monagas | " | 70,063 | 32,184,043 |
| | (8) | Oblig. | Border | " | 98,840 | 1,941,748 |
| | | | | | 191,167 | 38,791,163 |
| SIGNAL | (9) | Exploit. | Lake | 1956 | 27,614 | 33,679,906 |
| | (9) | Oblig. | Border | " | 98,840 | 1,941,748 |
| | | | | | 126,454 | 35,621,654 |
| VEN. ATLANTIC | (10) | Exploit. | Barinas | 1957 | 27,865 | 21,937,232 |
| | | " | Paria | " | 19,229 | 6,827,509 |
| | (10) | Explor. | Barinas | " | 53,225 | 3,485,437 |
| | (11) | Oblig. | Border | " | 74,130 | 1,456,310 |
| | | | | | 147,449 | 33,706,488 |
| SUPERIOR | | Exploit. | Lake | 1956 | 7,776 | 22,019,834 |
| | | Oblig. | Border | " | 24,710 | 485,437 |
| | | | | | 32,486 | 22,505,271 |
| KING-MILL | | Explor. | Barinas | 1957 | 49,420 | 4,207,120 |
| | | Oblig. | Border | " | 24,562 | 482,524 |
| | | | | | 73,982 | 4,689,644 |
| VAIOPA | (12) | Exploit. | Lake | 1956 | 2,079 | 1,934,692 |
| | (12) | Oblig. | Border | " | 23,598 | 540,858 |
| | | | | | 25,677 | 2,475,550 |
| GRAND TOTALS | | Exploitation | | | 768,351 | $629,690,881 |
| | | Exploration | | | 372,775 | 38,002,783 |
| | | Obligatory | | | 888,300 | 17,528,236 |
| | | | | | 2,029,426 | $685,221,900 |

DIVIDED INTERESTS:
(1) Blocks 9 through 14, Paria; and APUR-2-9000/3—Continental 25%; Texas, 25; Ohio, 25; Cities Service, 16 2/3; Richfield, 8 1/3 (the combine is known as Paria Operations Inc.).
(2) Nat Res and Sobrante of V-575, Lake; and APUR-2-8000—San Jacinto, 30%; Monsanto, 15; Murphy Corp., 15; Tennessee Gas, 15; Union of Louisiana, 15; Sharples, 5; Petrofina, 5.
(3) Block 10, Lake; and TACH-1-15000—San Jacinto, 25%; Phillips (operator), 45; El Paso Natural Gas, 10; Western Natural, 10; Sunray Mid-Continent, 5; Pacific Petroleums, 5.
(4) Block 1, Lake; and APUR-3-4000—Sun, 45%; VARCO, 45; Seaboard, 10.
(5) Block 12, Lake; and APUR-3-4001—Sun, 23 1/3%; Pan Venezuelan, 33 1/3; VARCO, 33 1/3, Seaboard, 10.
(6) Block 17, Lake; South Monagas Block 9; and TACH-1-11000 and TAZU-5-11000—Phillips, 55.7555%; Sunray Mid-Continent, 17.2662; Ashland, 10.7913; Kerr-McGee, 5.3957; El Paso, 3.2374; Western Natural, 3.2374; Pacific Petroleums, 3; Canadian Atlantic, 1.3165.
(7) Blocks 28 and 30, S. Monagas (about 2/3 of totals, this line)—Pan Venezuelan, 66 2/3%; Sun, 33 1/3.
(8) APUR-3-12000/1 (½ the totals, this line)—same as 7.
(9) Block 4, Lake; and Zulia 7-3000/3—Signal, 25%; Hancock, 25; Sohio, 25; Pure, 25.
(10) Blocks 11 and 27, Barinas—VARCO, 33 1/3%; Pan Venezuelan, 33 1/3; Sun, 33 1/3.
(11) APUR-3-14001/2 (2/3 of totals, this line)—same as 10.
(12) Nat Res of V-574, Lake; and ZULI-3-6000—farmed out to Sun, 45%; VARCO, 45; Seaboard, 10.

Source: VOSA Summary of Oct. 22, 1957.

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- Du Nord (Dunkirk)
- Gonfreville
- Petite Couronne
- Berre

**INDIA**
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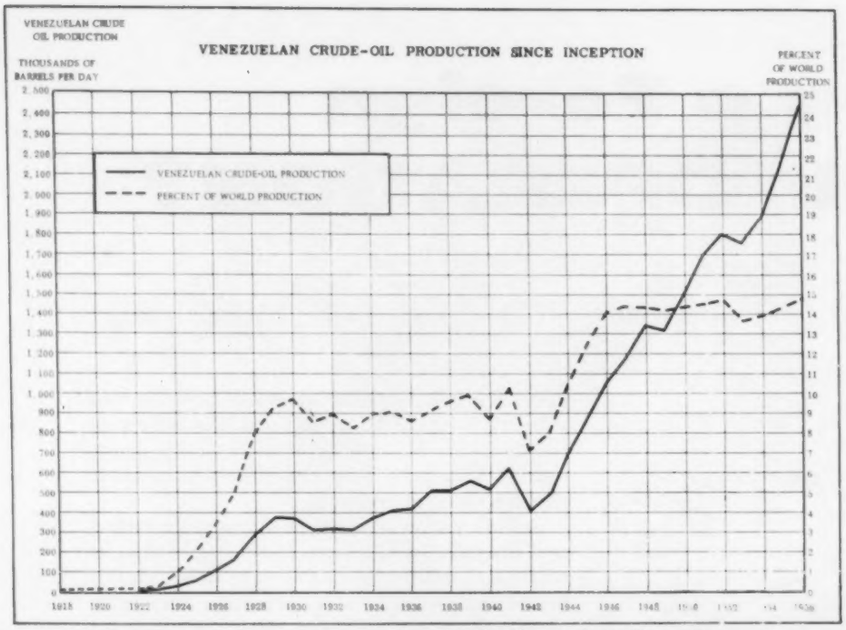
VENEZUELAN CRUDE OIL PRODUCTION
VENEZUELAN CRUDE-OIL PRODUCTION SINCE INCEPTION
THOUSANDS OF BARRELS PER DAY
PERCENT OF WORLD PRODUCTION
VENEZUELAN CRUDE-OIL PRODUCTION
PERCENT OF WORLD PRODUCTION

**Reserves:** Reserves in Venezuela increased steadily from about 28 million barrels of crude and about 0.6 billion cubic feet of natural gas in 1920 to some 3,350 million barrels of oil and 10.2 billion cubic feet of gas in 1940. Following World War II, reserves increased substantially—rising by 1956 to about 13,951 million barrels of crude, plus 26.9 billion cubic feet of natural gas. As of January 1, 1957, average reserve per oil well was 982,000 bbl.—with average reserve per gas well of 177 million cubic feet. Reserves by year-end 1957 are estimated to have risen to 15.890 billion barrels of crude and 32.4 billion cubic feet of natural gas.

**VENEZUELA—DRILLING & COMPLETION DATA**
**(1st 9 Months 1957)**

| | OIL | | GAS | | DRY | | |
|---|---|---|---|---|---|---|---|
| | Dev. | Expl. | Dev. | Expl. | Dev. | Expl. | Total |
| Creole | 146 | 1 | — | — | 4 | 8 | 159 |
| Mene Grande | 292 | 14 | 1 | — | 8 | 3 | 318 |
| Shell group | 483 | — | — | — | 2 | 1 | 486 |
| Sinclair | 20 | 1 | — | — | 1 | — | 22 |
| Texas | 30 | 2 | — | — | 3 | 5 | 40 |
| Mercedes | 23 | 10 | — | — | 5 | 15 | 53 |
| Socony | 70 | 6 | — | — | 5 | 1 | 82 |
| Atlantic | 55 | 3 | — | — | — | 8 | 66 |
| Phillips | 1 | — | 2 | — | — | 1 | 4 |
| Richmond | 49 | — | — | — | — | 1 | 50 |
| Tolon | 17 | — | — | — | 22 | — | 39 |
| | 1,186 | 37 | 3 | — | 50 | 43 | 1,319 |

**Production and Drilling:** Venezuelan production in 1957 rose to about 2,805,500 b/d, from around 885,330 b/d in 1945. Crude production in 1956 was 14% higher than in 1955, but rose more sharply in 1957 due primarily to the Suez crisis. At year-end 1957, production again began to decline—reflecting reappearance of Middle East crudes on the world market. From an average 2,792,036 b/d for the first month of 1957, production rose to a peak 2,968,618 b/d in July. Almost three million barrels daily, this was an all-time high for Venezuela. Production is distributed among producing companies as indicated in the accompanying tables.

Natural-gasoline production in Venezuela during the first half of 1957 totaled 586,196 bbl.—with butane production 393,157 bbl.

Although production during 1957 was substantially higher than in 1956, it is believed a lesser, but still healthy, growth of about 7% yearly will occur from the end of 1957 to 1960.

*Natural Gas:* Natural-gas production in Venezuela has increased sharply. Total 976.5 billion cubic feet produced in 1956 was double 1949 production. Use of natural gas remains relatively small. However, completion of a new petrochemical project by the government will lead to utilization of large quantities. This natural-gas development is discussed further under the sections of this report dealing with conservation and transportation.

**VENEZUELAN CRUDE PRODUCTION SINCE INCEPTION**
**(Annual Average in Barrels Per Day)**

| | Venezuelan Crude Production | % of World Production |
|---|---|---|
| 1918 | 917 | 0.1 |
| 1919 | 830 | 0.1 |
| 1920 | 1,254 | 0.1 |
| 1921 | 3,980 | 0.2 |
| 1922 | 6,224 | 0.3 |
| 1923 | 11,495 | 0.4 |
| 1924 | 25,183 | 0.9 |
| 1925 | 55,405 | 2.0 |
| 1926 | 100,022 | 3.4 |
| 1927 | 171,691 | 5.0 |
| 1928 | 286,546 | 7.9 |
| 1929 | 374,924 | 9.2 |
| 1930 | 375,443 | 9.7 |
| 1931 | 319,762 | 8.5 |
| 1932 | 318,357 | 8.9 |
| 1933 | 323,981 | 8.2 |
| 1934 | 373,707 | 8.9 |
| 1935 | 407,075 | 9.0 |
| 1936 | 422,691 | 8.6 |
| 1937 | 509,087 | 9.1 |
| 1938 | 515,583 | 9.5 |
| 1939 | 562,834 | 9.9 |
| 1940 | 508,520 | 8.7 |
| 1941 | 624,979 | 10.3 |
| 1942 | 405,340 | 7.1 |
| 1943 | 491,575 | 8.0 |
| 1944 | 702,289 | 10.3 |
| 1945 | 885,917 | 12.5 |
| 1946 | 1,064,683 | 14.1 |
| 1947 | 1,191,037 | 14.4 |
| 1948 | 1,338,831 | 14.3 |
| 1949 | 1,321,295 | 14.2 |
| 1950 | 1,497,890 | 14.4 |
| 1951 | 1,704,621 | 14.5 |
| 1952 | 1,804,702 | 14.7 |
| 1953 | 1,765,864 | 13.7 |
| 1954 | 1,896,283 | 13.9 |
| 1955 | 2,157,861 | 14.2 |
| 1956 | 2,456,785 | 14.8 |
| 1957 | 2,805,500 (est.) | 15.8 (est.) |

**VENEZUELA CRUDE PRODUCTION BY COMPANIES**
**(Barrels Per Day)**

| Company | 1956 | Average Jan. through Sept. 1957 |
|---|---|---|
| Creole | 1,083,721 | 1,207,069 |
| Shell | 710,300 | 892,173 |
| MGO | 364,658 | 407,662 |
| Socony | 97,157 | 112,003 |
| Mercedes | 24,105 | 26,648 |
| Richmond | 61,742 | 93,835 |
| Texas | 47,097 | 44,557 |
| Atlantic | 20,064 | 23,705 |
| Sinclair | 29,066 | 24,047 |
| Phillips | 11,073 | 14,164 |
| Pantepec | 4,900 | ..... |
| Talon | 2,730 | 2,325 |
| Caracas | 102 | 15 |
| Coro | 70 | 238 |
| Seaboard | ..... | 6 |
| TOTAL | 2,456,785 | 2,848,447 |

**VENEZUELA—CRUDE PRODUCTION BY COMPANIES**
**(Barrels Per Day)**

| Company | January 1957 | February 1957 | March 1957 | April 1957 | May 1957 | June 1957 | July 1957 | August 1957 | September 1957 | (January through October) 1957 | 1956 (Year) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Creole | 1,205,728 | 1,216,360 | 1,233,138 | 1,253,075 | 1,264,756 | 1,289,383 | 1,204,418 | 1,157,097 | 1,039,289 | 1,186,050 | 1,083,721 |
| Shell | 845,808 | 875,430 | 933,132 | 913,472 | 918,581 | 923,305 | 912,359 | 861,076 | 844,948 | 887,548 | 710,300 |
| MGO | 409,102 | 417,068 | 414,071 | 416,056 | 418,653 | 414,647 | 412,926 | 389,466 | 377,398 | 405,659 | 364,658 |
| Socony | 110,851 | 113,150 | 116,460 | 114,407 | 112,968 | 111,755 | 113,964 | 106,704 | 111,325+ | 113,513 | 97,157 |
| Mercedes | 24,040 | 24,840 | 25,172 | 25,081 | 25,756 | 26,326 | 28,619 | 27,730 | 32,213 | 27,253 | 24,105 |
| Richmond | 86,602 | 95,218 | 94,861 | 94,066 | 93,038 | 95,730 | 95,657 | 95,889 | 93,652 | 93,489 | 61,742 |
| Texas | 43,203 | 43,369 | 43,391 | 44,149 | 42,330 | 44,739 | 44,626 | 46,369 | 48,852 | 44,988 | 47,097 |
| Atlantic | 22,761 | 21,766 | 21,481 | 21,516 | 22,920 | 24,410 | 23,887 | 26,757 | 27,741 | 24,164 | 20,064 |
| Sinclair | 25,407 | 24,849 | 24,100 | 22,448 | 22,133 | 22,583 | 24,645 | 24,653 | 25,639 | 25,822 | 29,066 |
| Phillips | 14,237 | 14,885 | 14,963 | 14,780 | 13,576 | 13,576 | 14,215 | 13,701 | 13,598 | 14,093 | 11,073 |
| Pantepec | — | — | — | — | — | — | — | — | — | — | 4,900 |
| Talon | 4,005 | 3,024 | 2,534 | 1,934 | 2,062 | 1,987 | 1,966 | 1,781 | 1,654 | 2,249 | 2,730 |
| Caracas | — | — | — | — | — | — | — | 36 | 93 | 24 | 102 |
| Coro | 292 | 253 | 307 | 249 | 212 | 177 | 229 | 215 | 212 | 233 | 70 |
| Seaboard | — | — | — | — | — | — | — | — | 54 | 5 | — |
| Superior | — | — | — | — | — | — | — | — | — | 492 | — |
| Venez-Sun | — | — | — | — | — | — | — | — | — | 22 | — |
| TOTAL | 2,792,036 | 2,850,212 | 2,923,610 | 2,921,233 | 2,936,985 | 2,968,618 | 2,877,511 | 2,751,474 | 2,616,668 | 2,825,604 | 2,456,785 |

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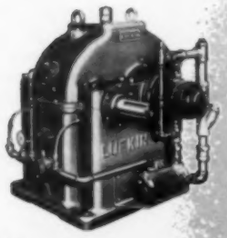

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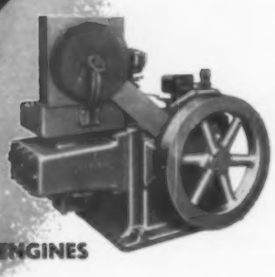

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**VENEZUELA—PRODUCING WELLS (By Company)**
(End 1956)

| Name of Company | Flowing | Artificial Lift | Total |
|---|---|---|---|
| Creole Petroleum Corp. | 1,750 | 1,989 | 3,739 |
| Compania Shell de Venezuela | 466 | 5,133 | 5,599 |
| Mene Grande Oil Co. | 1,116 | 1,270 | 2,386 |
| Socony Mobil Oil Co. | 340 | 85 | 425 |
| Texas Petroleum Co. | 131 | 7 | 138 |
| Richmond Exploration Co. | 6 | 252 | 258 |
| Sinclair Oil and Refining Co. | 177 | 162 | 339 |
| S. A. Petrolera Las Mercedes | 236 | 134 | 370 |
| Venezuelan Atlantic Refining Co. | 103 | 150 | 253 |
| Phillips Petroleum Co. | 141 | 213 | 354 |
| Pantepec Oil Co. | 3 | 1 | 4 |
| Talon Petroleum Co. | 12 | 81 | 93 |
| Coro Petroleum Co. | 5 | 1 | 6 |
| Caracas Petroleum Co. | 1 | .... | 1 |
| Total | 4,487 | 9,478 | 13,965 |

Source: Venezuela Ministry of Mines and Hydrocarbons.

**DOMESTIC CONSUMPTION IN VENEZUELA**
(Barrels Per Day)

| Year | Total | Gasoline | Kerosine | Gas Oil Diesel Oil | Fuel Oil | Other |
|---|---|---|---|---|---|---|
| 1944 | 11,062 | 3,309 | 1,070 | 861 | 5,629 | 193 |
| 1945 | 12,590 | 4,192 | 1,277 | 1,169 | 5,485 | 467 |
| 1946 | 15,655 | 6,001 | 1,540 | 1,491 | 6,183 | 440 |
| 1947 | 26,184 | 8,112 | 2,002 | 3,409 | 11,993 | 668 |
| 1948 | 31,960 | 10,167 | 2,149 | 5,018 | 13,796 | 830 |
| 1949 | 43,660 | 13,522 | 3,950 | 6,759 | 18,241 | 1,188 |
| 1950 | 51,518 | 14,828 | 4,653 | 7,437 | 22,826 | 1,774 |
| 1951 | 57,235 | 16,487 | 5,337 | 7,655 | 25,365 | 2,391 |
| 1952 | 61,673 | 19,264 | 5,917 | 9,452 | 25,076 | 1,964 |
| 1953 | 74,675 | 21,908 | 6,777 | 13,482 | 30,420 | 2,088 |
| 1954 | 89,931 | 25,179 | 7,461 | 15,003 | 40,001 | 2,287 |
| 1955 | 106,333 | 28,537 | 7,974 | 17,172 | 49,771 | 2,879 |
| 1956 | 123,412 | 32,152 | 8,521 | 20,272 | 59,161 | 3,306 |
| 1957* | 139,431 | | | | | |

*Based on first seven months.
Source: Venezuelan Ministry of Mines and Hydrocarbons.

Most of Venezuela's gas is produced by SAPLM (Sociedad Anonima Petrolera Las Mercedes)—owned jointly by Texas Petroleum Co. (wholly owned subsidiary of The Texas Co.), the operator, and Caracas Petroleum, wholly owned subsidiary of Ultramar Co. Ltd., of London, England. These two companies utilize two principal fields, Las Mercedes and Palacio, which are about 200 road-miles south of Caracas. Their 250-mile gas pipeline system is the only integrated gas-gathering operation of its kind in Venezuela. It supplies Caracas; Puerto Cabello, where Cia. Petroquimica's nitrate plant is located; and Valencia, as well as several towns along the way. Deliveries are made by SAPLM to VATCORT, Venezuelan Atlantic Transmission Corp., wholly owned by Venezuelan Atlantic Refining Co. (Barco).

**Conservation:** Conservation has taken a great step forward in Venezuela during the post World War II period, as shown by the accompanying tables on natural-gas production and utilization. Some of this gas is used for Venezuela's internal domestic market, as discussed in the section on pipelines. However, much more of it is used for conservation. Venezuelan Minister for Mines Edmundo Luongo Cabello has estimated that during the past five years—including the first five months of 1957—efforts applied to gas pressuring alone have resulted in the installation of plants with a joint pressuring capacity of 895 million cubic feet per day, which guarantees an additional (secondary) recovery of 726 million barrels of petroleum.

Production of natural gas has increased rapidly; however, the percentage increase in its utilization has been faster. Prior to the present conservation program, most of this gas was either flared or vented to the atmosphere. Twenty-three times more natural gas was returned to producing formations during 1956 than 10 years previously. Such reinjected gas represented 17.5% of 1956 production, compared with only 2.3% in 1946. The amount vented to the atmosphere in 1956 was 70.3%—a decline from the 87.6% in 1946. Although a number of reinjection plants returned a total 171.5 billion cubic feet of gas to producing formations in Venezuela in 1956, three plants are outstanding. These are No. 1 (LL-370), No. 2 (LL-453), and No. 3 (TJ-102). Their respective capacities are 129,315, and 300 million cubic feet. All installed by Creole Petroleum Corp., they are located in the Lake Maracaibo region.

Conservation in Venezuela has been defined as the government's principal aim (see article by Edmundo Luongo Cabello, Minister of Mines and Hydrocarbons, *World Petroleum*, July 1, 1957, p. 57)—which "embodies the very essence of Venezuelan oil policy." Government officials have stated (same source) that "Venezuela does not value its known reserves of 14 billion barrels of petroleum so highly as her 26 thousand billion feet of reserves of gas—not merely because of the vast volume of the latter, but because of the new significance they acquire from day to day in the light of the industrial diversification which is being brought about by the general progress of technology."

In view of the importance which the Venezuelan government attaches to this function, and because of its important effect on the country's ultimate oil and gas production, the legal basis for conservation in Venezuela is reviewed in another part of this report. The general objectives of this legislation have been defined by Minister Luongo as follows:

In the specific field of exploitation, the government maintains, in effect, a body of regulations which are strictly enforced, and among which the following are worthy of note: (a) those which refer to the precise determination of the production methods most expedient in the case of each deposit; (b) those which refer to the determination of the proper rates of production and of injection of fluids; (c) those necessary to establish the strict relationship between the gas, or water, and the oil and between potential and actual production; (d) those which contribute to the maintenance of reservoir pressure; (e) those which fix the correct space between the wells; (f) those whose purpose is to encourage installation of gas-injection and -treating equipment; (g) those concerned with the establishment of unified exploitation; (h) those which inexorably lead to the closing down of wells improperly located in relation to the oil-bearing structure or whose gas-oil ratio may be detrimental to the deposit; (i) those which forbid the exploitation of condensate reserves until such time as it has been possible to establish a use satisfactory to the government for the gas from the formation; (j) those which aim at the establishment of a technical equilibrium between the potential and actual volumes of production.

**VENEZUELA—SUMMARY OF WELL COMPLETIONS, BY COMPANIES**

| Period | Company | OIL Development | OIL Wildcat | GAS Development | GAS Wildcat | DRY Development | DRY Wildcat | Totals |
|---|---|---|---|---|---|---|---|---|
| 1957 (1st 10 months) | | NA | 0 | NA | 0 | NA | 11 | |
| 1957 1st Qtr. | Creole | 48 | — | — | — | — | 1 | 49 |
| 1956 (Year) | | 134 | 9 | — | | 9 | 14 | 166 |
| 1957 (1st 10 months) | | NA | 17 | NA | 1 | NA | 5 | |
| 1957 1st Qtr. | Mene Grande | 90 | 2 | 1 | — | 5 | — | 98 |
| 1956 (Year) | | 298 | 23 | 1 | 2 | 18 | 11 | 353 |
| 1957 (1st 10 months) | | NA | 1 | NA | 0 | NA | 1 | |
| 1957 1st Qtr. | Shell group | 214 | — | — | — | — | — | 214 |
| 1956 (Year) | | 436 | 6 | — | — | 16 | 7 | 465 |
| 1957 (1st 10 months) | | NA | 1 | NA | 0 | NA | 0 | |
| 1957 1st Qtr. | Sinclair | 8 | 1 | — | — | 1 | — | 10 |
| 1956 (Year) | | 41 | 7 | — | — | 4 | 6 | 58 |
| 1957 (1st 10 months) | | NA | 10 | NA | 0 | NA | 7 | |
| 1957 1st Qtr. | Texas* | 10 | 1 | — | — | — | 3 | 14 |
| 1956 (Year) | | 30 | 2 | — | — | 4 | 3 | 39 |
| 1957 (1st 10 months) | | | | | | | | |
| 1957 1st Qtr. | Las Mercedes* | 8 | 4 | — | — | 1 | 7 | 20 |
| 1956 (Year) | | 32 | 5 | 1 | — | 12 | 19 | 69 |
| 1957 (1st 10 months) | | NA | 6 | NA | 0 | NA | 2 | |
| 1957 1st Qtr. | Socony | 24 | 2 | — | — | 1 | — | 27 |
| 1956 (Year) | | 61 | — | — | — | 1 | — | 62 |
| 1957 (1st 10 months) | | NA | 3 | NA | 0 | NA | 4 | |
| 1957 1st Qtr. | Atlantic | 8 | 2 | — | — | — | 5 | 15 |
| 1956 (Year) | | 15 | 6 | — | — | 2 | 8 | 31 |
| 1957 (1st 10 months) | | NA | 0 | NA | 0 | NA | 1 | |
| 1957 1st Qtr. | Phillips | 1 | — | 2 | — | — | — | 3 |
| 1956 (Year) | | 41 | — | 3 | 1 | 1 | 2 | 48 |
| 1957 (1st 10 months) | | NA | 0 | NA | 0 | NA | 1 | |
| 1957 1st Qtr. | Richmond | 26 | — | — | — | — | — | 26 |
| 1956 (Year) | | 81 | — | — | — | 3 | — | 84 |
| 1957 (1st 10 months) | | NA | NA | NA | NA | NA | NA | |
| 1957 1st Qtr. | Pantepec | 2 | — | — | — | 1 | — | 3 |
| 1956 (Year) | | | | | | | | |
| 1957 (1st 10 months) | | NA | 0 | NA | 0 | NA | 0 | |
| 1957 1st Qtr. | Talon | 6 | — | — | — | 9 | — | 15 |
| 1956 (Year) | | 24 | — | — | | 12 | — | 36 |

NA—Not available. *Texas and Mercedes combined for 1st 10 months 1957.

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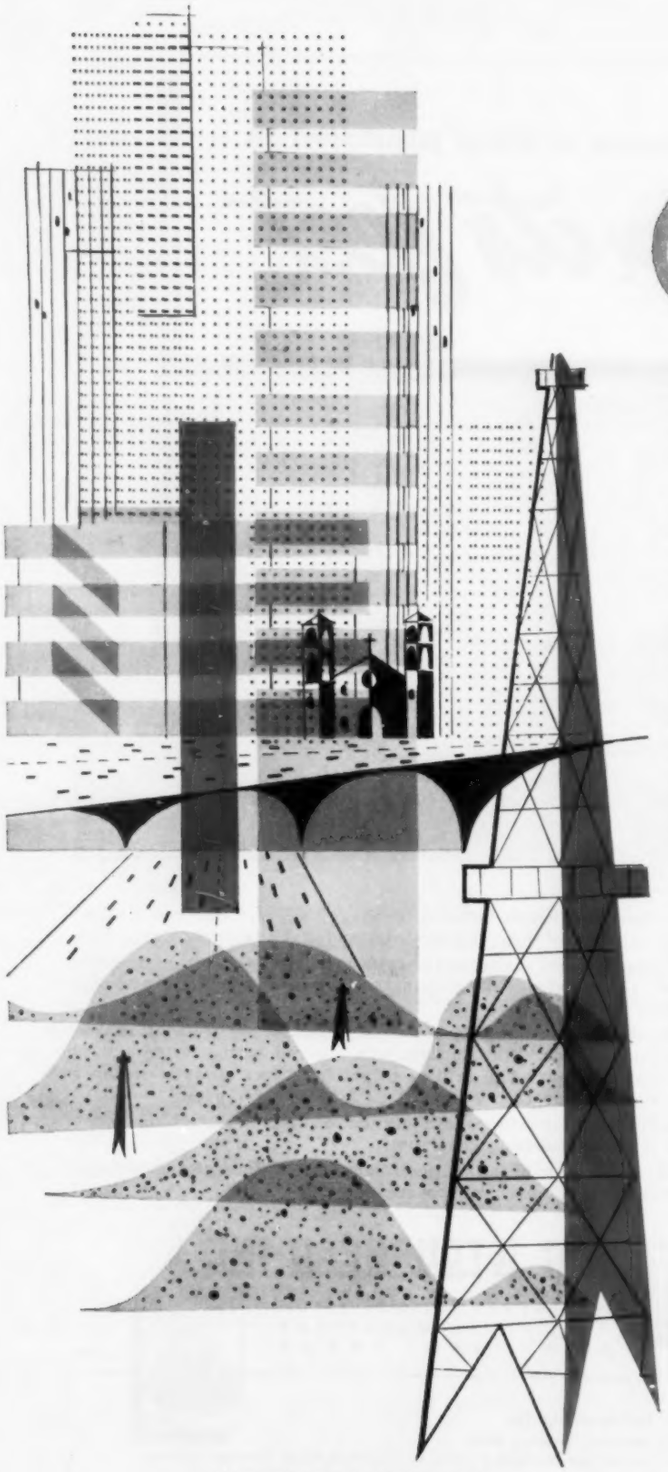

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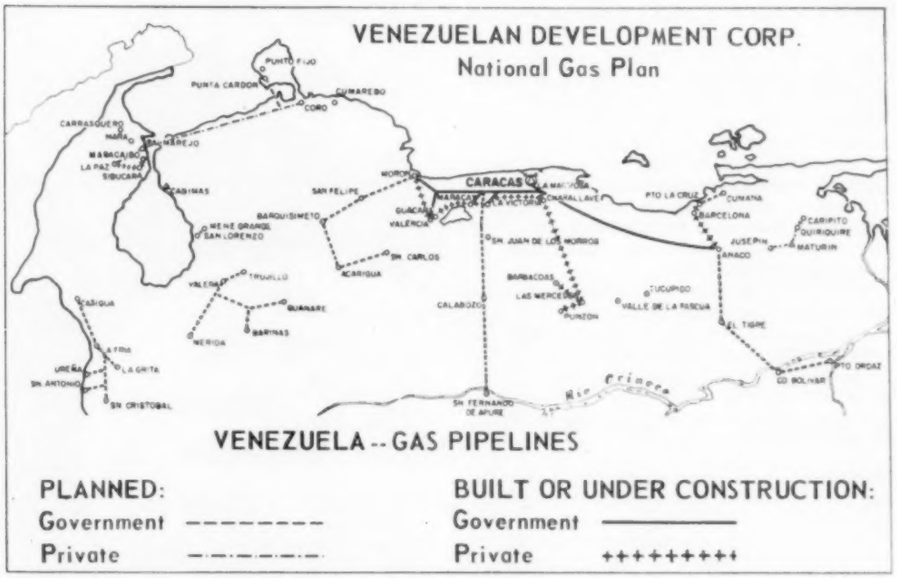
**Transportation:** The development of natural-gas pipelines has come in for considerable encouragement lately. There are two principal divisions of gas pipelines: government and private. Of the two, government pipelines anticipate a greater degree of construction.




Private gas pipelines in Venezuela comprise (1) the Venezuelan Atlantic line, previously discussed, which runs from the Las Mercedes fields to Caracas and westward to Valencia. (2) Eastern Venezuelan Gas Transport Co. (owned by Creole, International, Mene Grande, and Shell) runs some 60 miles from Monaco to Puerto La Cruz on the Caribbean. (3) Cia. Shell de Venezuela has completed "Pagline," a new 100-mile 20-in. line which now carries natural gas from the La Paz field in Maracaibo district to Cardon oil refinery on the Paraguana peninsula. The capacity of this line is 100 million cubic feet per day. The gas is to be used as fuel in the refinery so that liquid fuel can be replaced and exported.

Natural-gas activity by private concerns is increasing—stimulated by the provisions of new concessions under which the oil companies agree to encourage the use of natural gas by other industries and to deliver to the State's gas-line network, if required, an amount equivalent to a royalty of 16½% of any gas they themselves reject. Also, Royal Dutch-Shell is to provide 16 million cubic meters of gas per year (approximately two billion cubic feet) for 15 years to the State's petrochemical industry—presumably deliverable in Maracaibo, to which district the gas-line network will be extended.

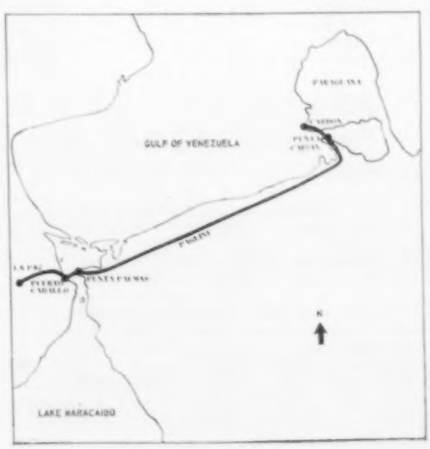
Government plans in the field of gas pipelines are extensive. They are based on a private-enterprise and national gas plan under the Government Development Corp. (Corporacion Venezolana de Fomento). This plan visualizes the construction of gas lines, as shown on the accompanying map, for industrial and domestic use.

At present the government is constructing the Anaco-Caracas leg of this pipeline. Petrogas SA is working on this, the biggest natural-gas pipeline project currently under way in South America. The line will be 207 miles long, 26 in. in diameter. There will also be a distribution system in Caracas. Fulghum Contracting Corp., of Harrisburg, Pa., are consultants on the line. With a capacity of 200 million cubic feet per day, estimated cost of the main line is $21.45 million. To this, the distribution system will add about $4.95 million. This line later will be extended 63 miles westward from Caracas to Guacara—and still later, west to Barquisimeto. It will also extend south from Monaco to the interior of Venezuela, where it will supply Ciudad Bolivar, at Puerto Orbaz.

*Crude Pipelines:* Almost all of the crude pipelines in Venezuela are owned by the five major private oil companies—including Creole, Shell de Venezuela, Mene Grande, Socony Mobil Oil de Venezuela, and Sinclair Oil & Refining Co. Creole's is the largest pipeline system in Venezuela—totaling about 485.4 miles of crude lines varying in diameter from 8 in. to 34 in., plus an 11-mile 8-in. refined-products line. Creole is now building a 92-mile 30-in. above ground pipeline from Temblador to its refinery at Caripito. Initial 50,000 b/d capacity is relatively low, since it will be transporting a low-gravity high-viscosity crude. Completion is scheduled for July 1958.

In western Venezuela, Creole will complete during the first quarter of 1958 a 26-in. 9-mile crude pipeline from Ule to La Salina, with initial capacity of about 450 b/d.

Creole has approximately 900 miles of 4-in. and 6-in. pipe on the bottom of Lake Maracaibo connecting its 1,570 wells to flow stations, plus 300 miles of 6-in. to 12-in. crude lines from flow stations to the shores of the lake.



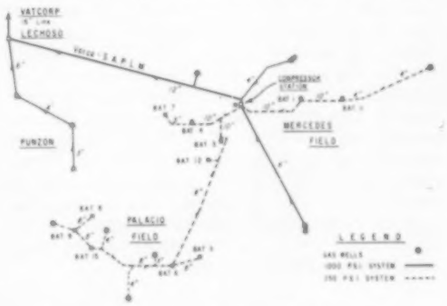

Cia. Shell de Venezuela has a large pipeline system which has been expanded by about 621 miles in the past six years. Of this, about 453 miles correspond to the main lines—including Lapline, Lightline, and Pagline.

Outstanding pipeline construction during 1957 was completion of the new Socony-Sinclair 20-in. 100,000 b/d line from Silvertre field, in the state of Barinas, some 212 miles to El Palito terminal near Puerto Cabello in the state of Carabobo on the Caribbean coast. With all three pumping stations in operation and two similar units at a possible booster station, this system can be increased to 150,000 b/d.

A new 32-mile 8-in., 19,000 b/d line was completed to Puerto La Cruz from Aguasay, new deep field brought in by Sinclair and Pancoastal Petroleum Co. The new line, wholly owned by Venezuela Petroleum Co. (Sinclair), links with the 16-in. Amana line which moves crude for companies from the Santa Barbara area to the port. Sinclair, Mene Grande, and Creole are joint owners of the larger crude trunk lines.

Mene Grande has a 97-mile 30-in. pipeline currently under construction from Anaco toward the Oficina pump station. It will increase the 350,000 b/d capacity of the existing system by 50,000 b/d. Consisting of double 16-in. lines from Oficina pump station at Monaco, a 26-in.

VENEZUELA: Principal components of SAPLM gas gathering system.




line from Monaco to Puerto La Cruz and a 16-in. line from Travieso parallel the main system. Mene Grande has just completed a 25-mile 16-in. line from Ceuta, Lake Maracaibo, to Bachaquero.

Mene Grande also plans to start soon a 16-mile 6-in. LPGas line from Anaco to Puerto La Cruz, to supply the Puerto La Cruz area.

**Refining:** With construction under way to be completed during 1958, Venezuelan refining capacity will have reached 874,000 b/d—about double the capacity five years ago. If the present trend continues, by 1960 capacity will be up to almost a million barrels—three times over 1951 levels.

There are two major refineries in the country, and the new construction during 1957 centered around these two plants. Amuay, the largest of them—owned by Creole—had 250,000 b/d skimming capacity, increased late in 1957 to 328,000 b/d when a new 104,000 b/d crude distillation unit went onstream.

The second largest refinery in Venezuela is owned by Cia. Shell de Venezuela, at Cardon. The new 33,000 b/d catalytic cracking unit was added during 1957, as well as an alkylation plant. A fourth distillation unit is under construction to raise the refinery's total capacity to 300,000 b/d. Total cost of these additions will be $84 million.

**VENEZUELA—REFINERY RUNS**
(Barrels)

| | 1957 (First Half) |
|---|---|
| Throughput (crude, and product intake for blending) | 129,790,000 |
| **Finished products obtained:** | |
| Aviation gasoline, 91-98 octane | 76,000 |
| Aviation gasoline, 100-130 octane | 59,000 |
| Aviation gasoline, 115-145 octane | 42,000 |
| Hydroformer feed | 33,000 |
| Motor fuel & special naphthas | 14,311,000 |
| Distillates for reconstituted crude | 1,697,000 |
| Kerosine | 2,969,000 |
| Gas oil & diesel oil | 23,291,000 |
| Fuel oil | 75,444,000 [1] |
| Narrow cut lube distillate | 438,000 |
| Finished lubricating oils | 537,000 |
| Slack wax | 107,000 |
| Asphalt | 1,567,000 |
| Stripped crude | 2,997,000 |
| Still gas, burned as fuel | 1,457,000 |
| Jet fuel | 1,964,000 |
| Wax distillate | 77,000 |
| Miscellaneous products | 164,000 |
| Losses (Gains) | —1,440,000 |
| Totals | 129,790,000 |

[1] Includes 3,102,000 barrels of crude transferred to fuel oil or refinery operations.

During 1957, the Venezuelan government erected a small 3,000 b/d refinery at Puerto Cabello. The plant was shipped ready-made from Houston, Texas, by Tifco Inter-America Corp. The plant includes a combined vacuum and distillation unit for Voscan crude; a simple atmospheric distillation unit for medium Tia Juana crude; a catalytic cycloversion unit (a Phillips process); a catalytic polymerization unit; a Unifiner for catalytic desulfurization (Union Oil of California type); a catalytic reforming unit (Atlantic Refining type) for the double purpose of producing high-octane gasoline and the maximum volume of aromatics. The small refinery is intended for research into methods of refining Venezuelan crudes and as a training ground for Venezuelan personnel. It will produce all types of motor gasoline and heating oils, as well as various byproducts—including asphalt. Both Boscan and Tia Juana (medium) crudes have considerable asphalt content.

According to government announcement, the Ministry of Hydrocarbons late in 1959 will begin a second refinery, of 40,000 b/d capacity, at Moron on the Caribbean coast as part of the National Petrochemical Industry. The Venezuelan government is investing $300 million in a three-stage petrochemical construction effort—in conjunction with the construction of additional gas lines within the country. Moron, site of the new petrochemical plants, is about 15 miles west of Puerto Cabello. First stage calls for a 150,000-tons-per-year fertilizer plant, which is to use natural gas. The 3,000 b/d refinery mentioned previously also is at this location. Cost of the first stage is $75 million. It also calls for building of a 10,000-ton chlorine and caustic-soda plant, two sulfuric-acid plants, and homes for 1,400 workers.

Second phase, also costing $75 million, will include plants for explosives, weed killers, insecticides, and fungicides.

Third stage, to cost $150 million, calls for a synthetic-rubber plant, a plastics plant, and the commercial refinery of about 40,000 b/d capacity. The government also is negotiating for purchase of the Venezuelan Atlantic Transmission Co. which now serves the Puerto Cabello area. This would assure a raw-materials supply for the fertilizer plant.

**Marketing:** Domestic consumption is increasing rapidly. Levels during 1956 were about eight times those 10 years previously. Chief cause of the rapid rise is industrialization of the country, furthered by the government's investment policy and by mechanization of agriculture. Contributing also to consumption increase is the large amount of new road construction.

Regular-grade gasoline is controlled by the government, and price increases are permitted only in the better grades of gasoline. Present price of 7.5 centavos per liter, ex refinery, is the same as in 1945. This applies also to the price of kerosine and of motor oil. The price of diesel fuels is up slightly, at 67 centavos.

The controlled price of gasoline has been the subject of contention with the oil companies for some time—the present price levels causing a heavy loss to the principal distribu-

## REFINERIES IN VENEZUELA—1957

(*Barrels Daily*)

| *Name of Company* | *Plant Location* | *Crude Capacity* | *Cracking Capacity* |
|---|---|---|---|
| Creole Petroleum Corp. | Amuay Bay [1] | 328,000 | — |
| | Caripito [2] | 75,000 | — |
| Cia. Shell de Venezuela | Cardon [3] | 203,000 | 35,000 |
| | San Lorenzo | 45,000 | — |
| Venezuela Gulf Refining Co. | Puerto La Cruz [4] | 59,000 | 8,500 |
| Sinclair Oil and Refining Co. | Puerto La Cruz | 35,000 | — |
| Colon Development Co. | Calvario [5] | 300 | — |
| | Casigua [5] | 1,000 | — |
| | La Rivera [5] | 300 | — |
| | El Cubo [5] | 570 | — |
| Socony Mobil de Venezuela | Silvestre | 200 [5] | — |
| Texas Petroleum Co. | Tucupita | 10,000 [5] | — |
| Richmond Exploration Co. | Bajo Grande | 30,000 [6] | — |
| Phillips Petroleum Co. | San Roque | 3,000(wax) | — |
| | Total | 790,370 | 43,500 |

[1] 11,100 fluid Hydroformer unit, fed by 20,500 b/d naphtha fractionator and stabilizer unit. 17,000 b/d diesel oil hydrofiner to be placed onstream early in 1958. Lube oils to be produced in 1958.
[2] Crude capacity is composed of atmospheric crude topping unit and coil-only Visbreaker with normal capacity of 60,000 b/d; additional 15,000 b/d can be processed by fluxing to visbreaker evaporator.
[3] 8,700 b/d thermal reforming unit. Processing facilities include gas separation unit and mixed $C_3/C_4$ polymerization plant. Lube oil manufacturing capacity of 3,000 b/d. Includes twin high vacuum feed preparation units, gas separation unit, HF alkylation unit, second polymerization unit, soda washing units, and solutizer gasoline treater.
[4] Has 14,000 b/d Visbreaker capacity. Cracking is fluid catalytic capacity. Plant owned 2/3 Mene Grande Oil Co., 1/3 The Texas Co.
[5] Skimming plant only. [6] Asphalt and skimming plant.

**PETROLEUM EXPORTS FROM VENEZUELA-NETHERLANDS ANTILLES—PERCENTAGE DIVISION INTO CRUDE OIL AND REFINED PRODUCTS**

| Year | Crude (%) | Products (%) |
|---|---|---|
| 1938 | 21 | 79 |
| 1947 | 36 | 64 |
| 1948 | 39 | 61 |
| 1949 | 38 | 62 |
| 1950 | 35 | 65 |
| 1951 | 35 | 65 |
| 1952 | 37 | 63 |
| 1953 | 38 | 62 |
| 1954 | 41 | 59 |
| 1955 | 44 | 56 |
| 1956 | 46 | 54 |

**VENEZUELA—EXPORTS OF CRUDE FIRST HALF 1957**
(Barrels)

| | |
|---|---|
| United States | 106,424,951 |
| Aruba | 84,201,028 |
| Curacao | 56,530,318 |
| Canada | 43,912,094 |
| United Kingdom | 20,106,350 |
| Netherlands | 15,163,177 |
| Argentina | 12,773,424 |
| British West Indies | 9,767,716 |
| Brazil | 9,009,752 |
| France | 6,622,640 |
| Italy | 4,669,198 |
| Puerto Rico | 4,166,031 |
| Cuba | 4,211,513 |
| Canary Islands | 3,919,708 |
| Germany | 3,704,628 |
| Uurguay | 2,857,849 |
| Sweden | 2,336,100 |
| Chile | 1,724,504 |
| Belgium | 1,359,772 |
| Israel | 1,061,735 |
| Portugal | 656,041 |
| Australia | 470,291 |
| Norway | 335,578 |
| Spain | 272,967 |
| Mexico | 239,586 |
| | 396,507,951 [1] |

[1] Includes 4,727,168 barrels of naphtha and other derivatives added to crude shipments.
**Note:** Information on the amount of naphtha and other derivatives added to crude shipments to the individual countries is not available.

**POSTED PRICES OF TYPICAL VENEZUELAN AND OTHER CRUDES**

| | | |
|---|---|---|
| **A. Venezuelan Crudes** | | |
| Guanipa (31.0 to 31.9 API) | $2.80 | fob Venezuelan port |
| Tia Juana medium (26.0 to 26.9) | 2.55 | " " " |
| Lagunillas heavy (asphalt) (17.0 to 17.4) | 2.38 | " " " |
| Lagomar (31.0 to 31.4) | 2.80 | " " " |
| San Joaquin (wax) (41 to 41.9) | 3.34 | " " " |
| **B. United States Crudes** | | |
| West Texas sour (31.0 to 31.9) | $3.08 | fob USA Gulf port |
| East Texas (39.0) | 3.39 | " " " " |
| **C. Middle East Crudes** | | |
| Arabian (34.0 to 34.9) | $2.08 | fob Ras Tanura |
| Kuwait (31.0 to 31.9) | 1.85 | " Mina-al-Ahmadi |
| Iran light (34.0 to 34.9) | 1.99 | " Abadan |
| Iran heavy (31.0 to 31.9) | 1.80 | " " |
| Iraq (36 to 36.9) | 2.59 | " Tripoli (eastern Mediterranean) |

**VENEZUELA—EXPORTS OF NATURAL GASOLINE AND BUTANES**
First Half 1957 (Barrels)

| Destination | Product | Jan. 1-June 30, 1957 |
|---|---|---|
| Curacao | Natural Gasoline | 589,517 |
| Curacao | Butanes | 375,086 |
| Totals | | 964,603 |

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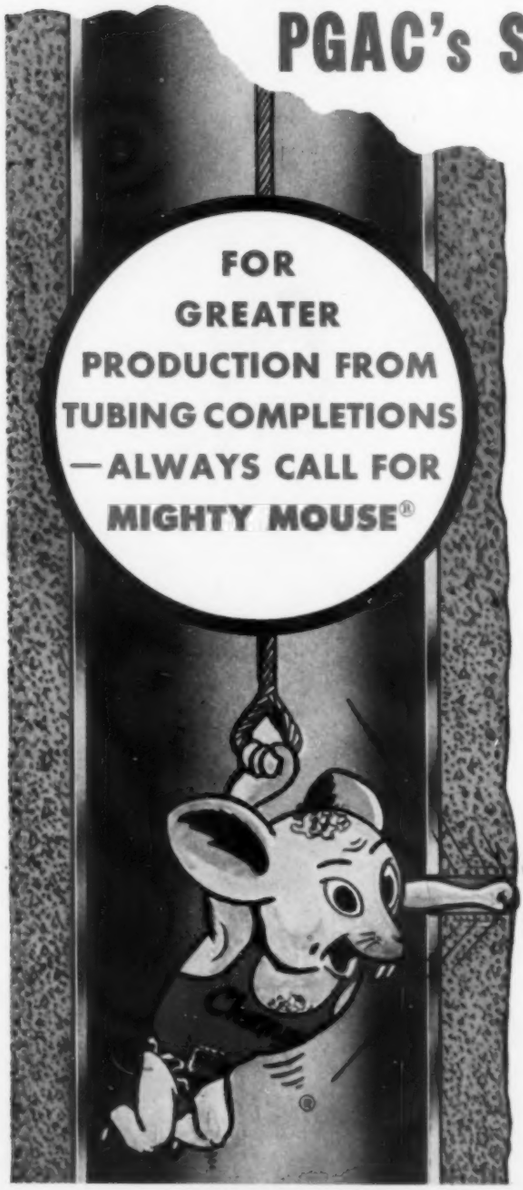


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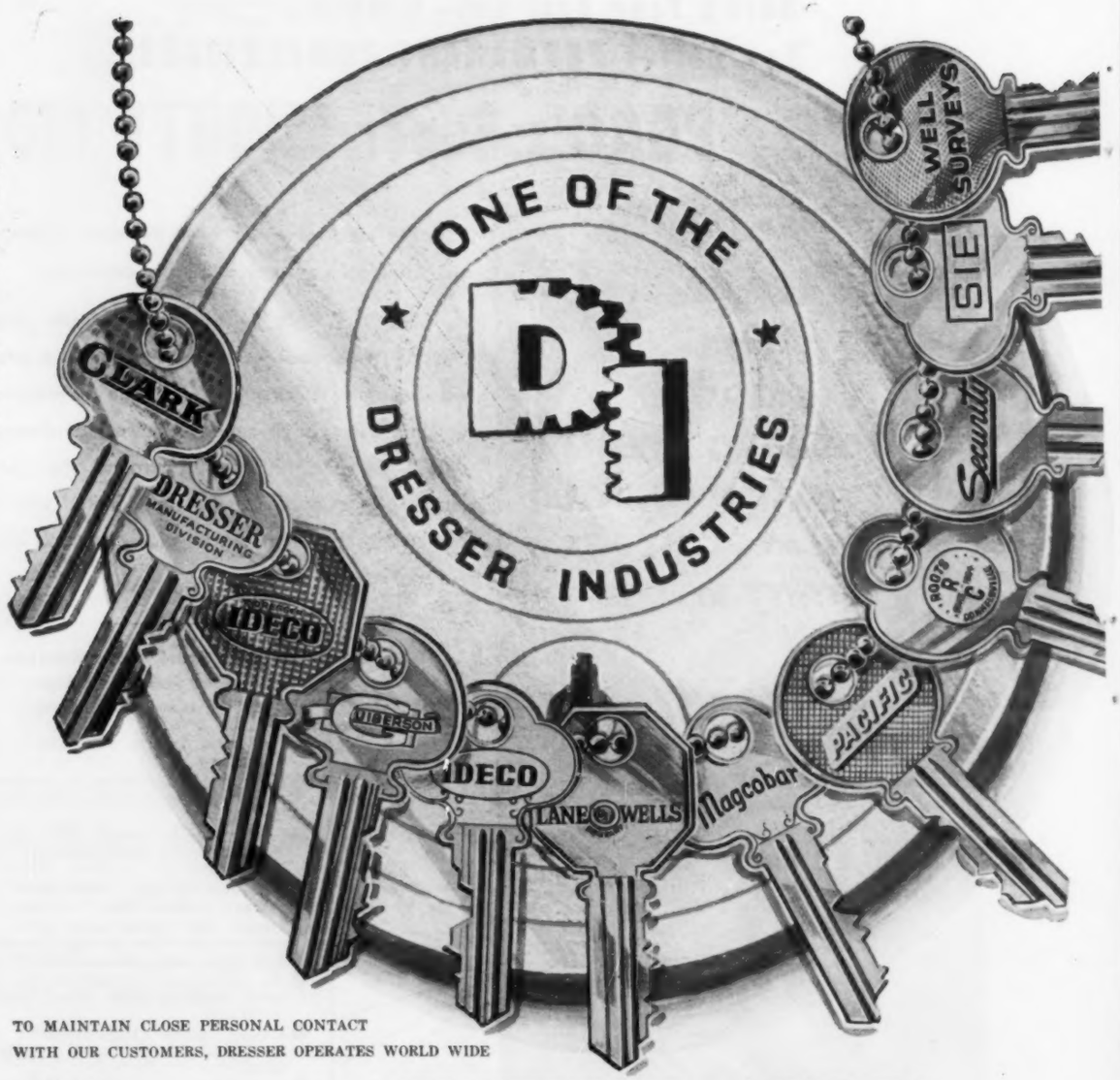


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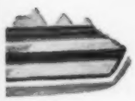

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**VENEZUELA—EXPORTS OF REFINED PRODUCTS FIRST HALF 1957**
**(Barrels)**

| Destination | Gasoline | Fuel Oil | Gas Oil | Diesel Oil | Kerosine | Asphalt | Lube Oils | Others | Totals |
|---|---|---|---|---|---|---|---|---|---|
| United States | 86,801 | 37,853,743 | 147,418 | 1,384,076 | 829,311 [1] | 622,635 | | 5,297,413 [2] | 46,211,397 |
| United Kingdom | 842,036 | 4,962,584 | 605,878 | 2,741,308 | 1,148,779 [3] | | 123,901 | 402,365 [4] | 10,826,851 |
| Brazil | 1,359,533 | 2,649,123 | 954,444 | 1,263,856 | 426,336 | | 4,585 | 24,079 [5] | 6,681,956 |
| Sweden | 389,300 | 983,945 | | 2,613,533 | | | | 106,094 [6] | 4,092,872 |
| Aruba | | 1,268,750 | 1,528,797 | 587,624 | | | | 66,453 [7] | 3,451,624 |
| French West Africa | 437,942 | 1,682,777 | 135,896 | 976,219 | 69,604 | | | | 3,302,438 |
| Canary Islands | | 1,931,099 | 7,624 | 592,921 | | | | | 2,531,644 |
| Cuba | 370,883 | 1,670,473 | | 227,347 | | | | | 2,268,703 |
| British West Indies | 12,518 | 982,793 | | 130,001 | 12,397 | 6,001 | | | 1,143,710 |
| Germany | | 493,010 | 9,441 | 264,615 | 81,153 [8] | | 39,501 | | 887,720 |
| Argentina | | 413,227 | 310,914 | | | | 105,031 | | 829,172 |
| Nigeria | 363,939 | | 119,448 | 163,635 | 128,605 | | | | 775,627 |
| Belgium | 193,437 | 44,389 | | 504,395 | | | | | 742,221 |
| Cape Verde Islands | | 558,898 | | 116,163 | | | | | 675,061 |
| Puerto Rico | | 309,430 | 323,772 | | | 12,404 | | | 645,606 |
| Norway | | 410,888 | | 213,867 | | | | | 624,755 |
| Panama | 49,169 | 456,968 | | 127,353 | | | | | 633,490 |
| Denmark | 195,996 | | 71,039 | 321,167 | 8,278 | | | | 596,480 |
| Chile | | 562,904 | | | | | | | 562,904 |
| Belgian Congo | 264,451 | | 20,216 | 169,042 | 89,741 | | | | 543,450 |
| Peru | | 545,028 | | | | | | | 545,028 |
| Dominican Republic | | 395,024 | | 67,008 | | 65,775 | | | 527,807 |
| Italy | | 433,267 | | | | | | | 433,267 |
| Whaling Grounds | 31 | 425,481 | 5,787 | 17,178 | | | | | 448,477 |
| Portugal | | 154,356 | 68,070 | 57,007 | 98,206 | | | | 377,639 |
| Curacao | | 104,062 | | 264,287 | | | | | 368,349 |
| Netherlands | | 245,146 | 3,000 | 24,500 | | | 9,082 | | 281,728 |
| Ghana | 70,543 | | 113,755 | 11,246 | 58,253 | | | | 253,797 |
| Uruguay | 57,390 | 201,211 | | | | | | | 258,601 |
| Central America [9] | 74,933 | 153,338 | | | | 29,185 | | | 257,456 |
| Sierra Leone | | 72,152 | | 128,103 | | | | | 200,255 |
| Canada | | | | 176,780 | | | | | 176,780 |
| Angola | 46,093 | | 28,299 | 72,612 | 9,240 | | | | 156,244 |
| Australia | | | | | | | 149,445 | | 149,445 |
| Guatemala | 37,362 | 79,984 | | 6,001 | | 31,638 | | | 154,986 |
| Mexico | 136,518 | | | | | | | | 136,518 |
| France | 70,435 | | | 54,119 | | | | 21,253 [10] | 145,807 |
| Spain | | 119,013 | | 6,045 | | | | | 125,058 |
| Costa Rica | 6,001 | 67,674 | | 9,303 | | 33,217 | | | 116,195 |
| Liberia | 35,476 | | | 21,398 | 23,078 | | | | 79,952 |
| Finland | | 79,902 | | | | | | | 79,902 |
| El Salvador | 23,002 | 25,003 | | 7,001 | | 24,160 | | | 79,166 |
| Spanish Morocco | | 49,584 | 14,826 | | | | | | 64,410 |
| Haiti | | 46,074 | | 3,000 | | | | | 49,074 |
| Nicaragua | 16,002 | | | | | 17,392 | | | 33,394 |
| Paraguay | | | 7,605 | | 5,775 | | | | 13,380 |
| Syria | | | | | 10,291 | | | | 10,291 |
| Totals | 5,139,792 | 60,431,300 | 4,476,229 | 13,322,710 | 2,999,047 | 842,407 | 431,545 | 5,917,657 | 93,560,687 |

[1] 786,401 barrels of jet fuel; and 42,910 barrels of kerosine. [2] Stripped crude. [3] 1,086,471 barrels of jet fuel; and 62,308 barrels of kerosine. [4] 313,098 barrels of narrow cut lube distillate; and 89,267 barrels of slack wax. [5] Liquid propane. [6] Narrow cut lube distillate. [7] 35,859 barrels of narrow cut lube distillate; and 30,594 barrels of aviation aromatics. [8] Jet fuel. [9] Breakdown by country of destination is not available. [10] Slack wax.

tors, Creole and Shell. With the issue involved in politics, however, little chance of change appears in the near future. The oil companies are making a determined effort to move sales out of the lower-priced gasoline into the premium, uncontrolled grades. This change is needed because of the rising compression ratios in most modern cars.

*Exports:* Petroleum exports in Venezuela comprise by far the major part of the country's production. The importance of oil exports to the country's general economy is obvious from an examination of the government's income statements.

The two most important influences on demand for markets for Venezuelan petroleum are weather and the level of industrial activity. This is especially true because of the nature of Venezuelan crude—a heavy type with low sulfur content, which favors refining of the heavier products used primarily for heating and power generation. This has been of considerable significance to Venezuela in retaining her share of European markets in face of competition from the Middle East, since fuel oil is primarily an industrial fuel.

The recent dredging of the Lake Maracaibo bar—now permitting tankers of 35,000 tons and 33-ft. draft to negotiate the bar into the lake—has had an impact on Venezuelan exports. This will stimulate the use of larger tankers in the lake.

**PRICES FOR INTERNAL CONSUMPTION OF VENEZUELA'S REFINED PRODUCTS IN THE CARACAS AREA**
**(Effective January 1 from 1945 to 1957)**

| | | 1957 | 1956 | 1955 | 1950 | 1946 | 1945 |
|---|---|---|---|---|---|---|---|
| Gasoline (75 oct.) | Cents of B$/liter ex-refinery | 7.50 | 7.50 | 7.50 | 7.50 | 7.50 | 17.00 |
| | At filling station | 10.00 | 10.00 | 10.00 | 10.00 | 10.00 | 20.00 |
| Gasoline (83 oct.) | Cents of B$/liter ex-refinery | 11.25 | 11.25 | — | — | — | — |
| | At filling station | 14.00 | 14.00 | — | — | — | — |
| Gasoline (93-95 oct.) | Cents of B$/liter ex-refinery | 17.75 [1] | 17.00 | 17.00 | — | — | — |
| | At filling station | 21.00 | 20.00 | 20.00 | — | — | — |
| Kerosine | Cents of B$/liter ex-refinery | 6.50 | 6.50 | 6.50 | 6.50 | 6.50 | 8.50 |
| | At store | 10.00 | 10.00 | 10.00 | 10.00 | 10.00 | 12.50 |
| | Delivered home | 12.50 | 12.50 | 12.50 | 12.50 | 12.50 | — |
| Diesel fuel medium | B$/ton. M. ex-refinery | 67.00 | 67.00 | 64.00 | 64.00 | 64.00 | 64.00 |
| Fuel oil | B$/ton. M. At warehouse | 26.00 | 24.00 | 22.00 | 21.00 [3] | 30.00 | 30.00 |
| **Lubricants** | | | | | | | |
| Extra motor oil | Cents of B$/liter at filling station | 2.50 | 2.50 [2] | 2.00 | 2.00 | — | — |
| Motor oil | Cents of B$/liter at filling station | 1.50 | 1.50 | 1.50 | 1.50 | 1.50 | 1.50 |

**Note:** Prices given in bolivares. One bolivar equals 32 US cents.
[1] Price increase due to better product, May 1956.
[2] Price increase due to better product, December 1955.
[3] Price effective in Cafia La Mar from 1950 to 1957.
**Source:** Gasoline, diesel medium, and lubricants from Creole Petroleum Co., fuel oil from Compañía Shell de Venezuela, through Ministry of Mines & Hydrocarbons.

## OIL LAWS

The accompanying summary of Venezuela's oil law gives its principal conditions. These conditions were covered in more detail in *World Petroleum Report 1957*, and are not repeated here. This section is devoted to a discussion of the law's principal problems, and the law dealing with conservation.

Basic statute relating to petroleum is Hydrocarbons Law of 1943—still operative in its original form except for a few relatively unimportant amendments made in 1955. This law has become the most important in the world as concerns development of petroleum outside the United States.

### Oil Law Summary★

**EXPLORATION: Duration:** 3 yrs. **Area:** 24,710 acres per concession. No limit per concessionaire. **Surface Tax:** 25.9 cents per acre annually. **Transfer:** Any time. If transferee holds over 741,300 acres government consent necessary. **Special Advantage:** Government may request "special advantages to the nation," on new concessions. This may include bonus, refining obligation, additional production tax, etc.

**EXPLOITATION: Duration:** 40 yrs. May be renewed once for 40 years. **Area:** 1,235.5 acres per concession. No limit per concessionaire. Maximum ½ exploration area. **Transfer:** Any time. If transferee holds 370,650 acres, government consent necessary. **Production Tax:** Initial $1.036 per acre first year. **Surface Tax:** $0.64 yearly per acre for the first five years, thereafter rising gradually to maximum $3.88 per acre. If royalty is being paid, reduced to a minimum of 16.2 cents per quarter per acre. **Royalty:** 16 2/3% on crude or gas, payable in kind or cash. **Refining-Transportation:** Rights of refining and transportation included in exploitation concession. Consumption Tax assessed of 50% import duties on refined products sold for consumption in Venezuela. Tax of 2½% of receipts from third parties assessed for pipeline transportation. **Income Tax:** Assessed to give government at least 50% net income. Foreign taxes paid not deductible. No depletion allowance.

★Taken from *World Petroleum Legislation*, 604 Fifth Ave., N. Y. 20, N. Y. (see p's 37-38)

**Conservation:** Conservation in Venezuela is based upon the Hydrocarbons Law of 1943—although it first appeared in legislation passed in 1918. Conservation principles are inherent in the basic concept of State ownership, partly because the legal system makes conservation of oil and gas easier in the large holdings or concessions. Usually the fields are owned by just one operator—never by more than four.

Basic legislation is flexible in its application to conservation. A technically skilled group within the government is responsible for its application, but the law empowers the government to take any measures conservationwise whenever these are required by the national interest. Absence of specific conservation rules sometimes has retarded application of conservation practices because of differences of opinion between the government and the operator; however, it permits broad and flexible application to each individual problem.

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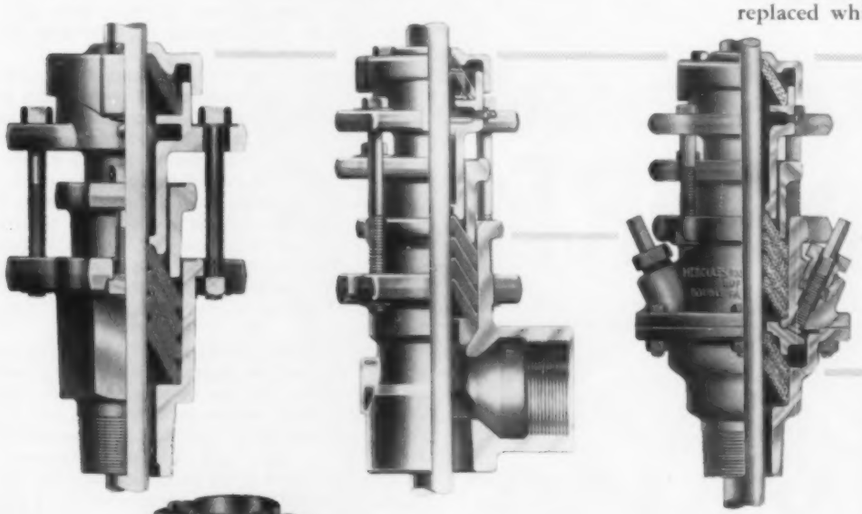
Hercules oil field production equipment was first used in Kansas and Oklahoma oil fields. From this area, because of its consistent quality and rugged construction, its use spread first over all of the fields in the United States and Canada. Now its popularity has spread around the globe and you will find Hercules products available through supply houses everywhere.

Hercules Duplex Polished Rod Stuffing Boxes are available in three styles:

1. "Regular Type" — Has male thread to screw into Pumping Tee.
2. "Tee- Type" — A combination Tee and Stuffing Box. Has female thread to screw directly into tubing.
3. "Type DP" — Double Packed for use on high pressure or intermittently flowing wells. Allows Main Packing to be replaced while pressure is on well.



**HERCULES "REGULAR TYPE" DUPLEX STUFFING BOX**

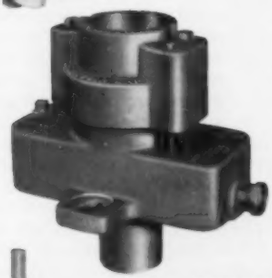
More efficient operation with fine adjustment possible. Offers longer packing life due to ability of Packing and Glands to follow lateral movement of Polished Rod. Malleable iron construction prevents breakage if rods are accidentally dropped on Stuffing Box.

**HERCULES "TEE TYPE" Duplex Stuffing Box**

Very compact as it is approximately only 15" high. Eliminates one threaded connection between Stuffing Box and Tee. Full opening — allows Rods to be run or pulled without removing Stuffing Box body.

**HERCULES "TYPE DP" (Double Packed) DUPLEX STUFFING BOX**

Designed for use on high pressure or intermittently flowing wells. Allows Main Packing to be easily changed by turning the two compression bolts until lower Packing Set packs-off. The Upper Packing Set can then be removed and replaced.



**HERCULES OIL RESERVOIR UPPER GLAND**

Any Hercules Stuffing Boxes may be equipped with Oil Reservoir Upper Gland on "problem" wells which pump-off and burn packing. The polished rod moves through the oil in the reservoir which lubricates and cools it.

**HERCULES POLISHED ROD CLAMP-OFF SUPPORT**

For use with all Hercules Stuffing Boxes (except "DP TYPE" Box). Manufactured from Hi-Tensile aluminum alloy, weighing only 20 pounds. These supports offer maximum safety with minimum weight. Easily handled and installed by one man. Prevent accidents and personal injuries, while clamping-off, by using Hercules Clamp-Off Supports.

*Write for complete information on any Hercules product, without obligation.*

**HERCULES CONE-SHAPED PACKING RINGS**

Hercules Split Cone packing rings come in three grades: SOFT rings are used always with bronze liners or with steel polished rods in wells which are not always pumping fluid. HARD Rings are used and recommended for steel polished rods only, and where fluid is constantly being pumped. LUBRICATED Rings are recommended for problem wells which pump-off persistently. When well is pumped dry, the rings lubricate the polished rod and prevent the packing from burning until fluid is again present.

HERCULES SPLIT CONE PACKING RINGS are packed in sets of four in each of three grades: SOFT, HARD and LUBRICATED.

HERCULES TOOL Company

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Prime objectives of conservation are to (a) further the national interest as it concerns Venezuela's economic development; (b) adjust production to demand in national and world markets. The Venezuelan government does not intervene in economic aspects of production as these relate to supply and demand, but instead concentrates upon the establishment of rates of production at or below the "maximum efficient rate." The basic legislation in the Hydrocarbons Law which affects petroleum is as follows:

Obligations of the concessionaire are to carry out all operations of exploration, exploitation, manufacture or refining, and transportation in accordance with the technical principles applicable; to take all necessary measures to protect water horizons which are encountered during drilling operations; to take, in the drilling of wells or abandonment thereof, all measures technically advisable so as to avoid damage of any kind which might result to the oil fields and be prejudicial to the interests of the nation or those of third parties, and to notify to the pertinent officials of the Ministry of Mines and Hydrocarbons anything which may occur in this respect; to exercise due care in order to avoid any loss of oil and gas, and to carry out operations in such manner as to avoid waste of those substances, and in this regard the concessionaires shall be responsible for the damages caused to the nation or third parties; and to comply with all of the provisions which are applicable to them, as contained in the laws, decrees, resolutions, and ordinances, but this without prejudice to the rights which they acquire by virtue of the concession (Art. 59).

The Administration has the right to inspect all the works and activities related to exploration, exploitation, manufacture or refining, transportation, and handling of oil and gas, for all the purposes as provided in the Law and its Regulations. The concessionaires shall furnish to the National Government officials who carry out the inspections and auditing the most ample facilities for the thorough discharge of their duties (Art. 68); refusal by the concessionaires or opposition in any way to permit the inspections or auditing prescribed in the law shall be penalized by fines in each case of refusal. (See the Law, Section on Penalties and Appeals, Art. 86.)

The principles referred to above have been elaborated by the following provisions of the Regulations of the Law:

The concessionaires must control the production of gas and make use of it or return it to the formation insofar as possible. Natural gasoline contained in wet gases which are produced in commercial quantities shall be extracted, provided it is economical to do so. Excess gas which comes from the formation, and which cannot be utilized or returned to the formation, must be disposed of in suitable gas burners. The direct escape of gas into the air shall only be permitted in the case of gas coming out of wells having very low pressure (Art. 121).

Every petroleum and gas well which is to be abandoned must be plugged up after due notice in writing by the concessionaire to the respective Field Petroleum Inspector, who in turn must report it to the Technical Inspection Office. When the Field Petroleum Inspector has no objections to the proposed plugging, he shall so advise the concessionaire within a period of five days beginning on the date on which the notice was submitted. Should the Inspector find that the execution of the project is contrary to technical principles or regulatory precepts, he shall likewise advise the concessionaire and report it to the Technical Inspection Office. The date to be submitted should include name and location of well, characteristics of the gas, petroleum and water strata encountered and manner in which they will be shut off, method and materials that are to be used in the plugging, geological section of the well with sketch showing the plugging operation, and specification of the pipes to be withdrawn. When the concessionaire deems that the plugging of the well does not suit his interest, he shall communicate it by writing to the respective Inspector, giving all his reasons and details of the case (Art. 123).

The Field Petroleum Inspector who considers that the gas-oil ratio is above normal shall so advise, in writing, the concessionaire, giving a report of his action to the Technical Petroleum Inspector of his jurisdiction. In the event that the concessionaire does not give a satisfactory explanation, or should the infraction continue notwithstanding the notice given him, the Minister of Mines and Hydrocarbons shall order the appropriate action (Art. 122).

The Field Petroleum Inspector shall watch the production of each well so that the normal rate of production be maintained (Art. 122). The Ministry of Mines and Hydrocarbons considers that the production of a well with an unreasonably high gas-oil ratio, as determined by the rules of good exploitation, constitutes a violation of the basic conservation principles of the Law.

The concessionaire must report the results of production tests of each well to the respective Field Petroleum Inspector, who shall wit-


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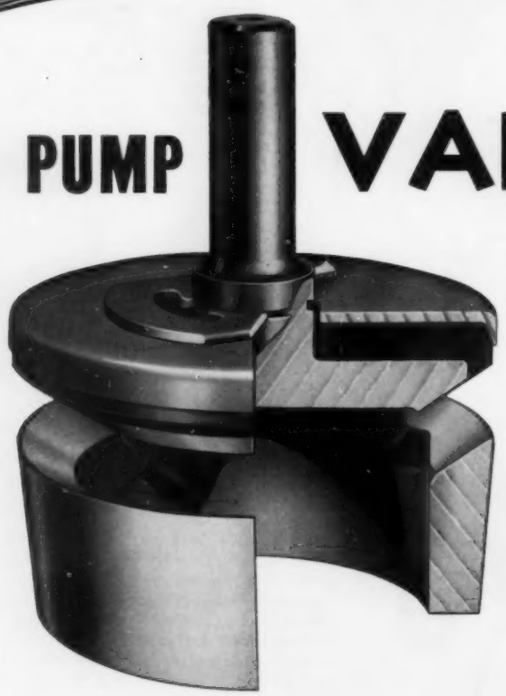
*The* SHIELDED INSERT

SLUSH PUMP VALVE



It is well known that oil based muds cause slush pump inserts to swell and distort. The E. & T. **Shielded Insert Valve** exposes only the sealing face to the drilling fluid. The rest of the insert is firmly covered and sealed in. It is held firmly in place by the patented **Shield.** The small exposed area is not sufficient for harmful swelling to occur.

Many users have found that E. & T. **Shielded Insert Valves outlast all others** and that the savings in "down time" due to fewer insert changes easily pays for the changeover.

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ness such tests whenever he deems it convenient (Art. 122).

The right of the Government to inspect and audit the operations of the concessionaires is exercised through the Technical Bureau of Hydrocarbons, and the appropriate staff which may be specially designated for such purpose. The inspection and auditing provided in the Law shall be exercised, in conformity with the legal and regulatory provisions applicable, by the public officials in whom these attributions are vested (Art. 97).

It is the duty of the Technical Petroleum Inspectors to see that the administrative and technical conditions set forth in the Law and its Regulations be complied with by the concessionaires; they should call the attention of those who violate them and suggest all the measures beneficial to the Nation which they deem necessary, regarding the adequate development of the oil industry. The Technical Petroleum Inspectors have the right to request from the concessionaires all the data and reports necessary for the proper fulfillment of their functions (Art. 105).

The Field Petroleum Inspectors have the duty to inspect, as frequently as possible, the oil operations in their jurisdiction in order to ascertain that the provisions of the Law and its Regulations are met, paying particular attention to the methods employed by the concessionaires so that their operations may not cause any damage.

The Regulations also specify the distance of proposed well locations to the boundaries of concessions and to other wells, in order to prevent oil drainage detrimental to the Nation or to third parties (Art. 109).

## NATIONAL FACTORS

The principal national factors affecting oil investment and operation in Venezuela are the political climate, the legal regulation of the industry, and the economic situation. As regards the first, the political situation appears to be stable.

The legal situation as concerns oil is generally satisfactory, and no changes are known to be pending which would affect that estimate. The Hydrocarbons Law of 1943, still in effect, has its drawbacks, and is expensive. However, contained in the law are the fundamentals of a maximum government share, a sufficiently large area for exploration and development, guaranteed conversion, right to convert to development stage even if oil has not been found, and freedom of surrender.

**VENEZUELA—OIL INCOME AND TOTAL GOVERNMENT REVENUE**
**(Billions of Dollars)**

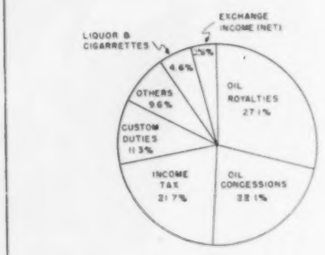
| Year | Oil Revenue | Total Revenue |
|---|---|---|
| 1957* | 1.2 | 1.6 |
| 1958 | 1.2 | 1.6 |
| 1959 | 1.1 | 1.5 |
| 1960 | 1.2 | 1.6 |

*Higher than normal, due to concession payments in that year, not estimated to continue in later years.

**Economic:** One of the principal factors in maintaining political stability is the economic picture. A summary statistical picture of the Venezuelan economy is given in accompanying tables. Generally, the picture is favorable. The general price index declined during 1956, and has only increased from 137.10 in 1946 to 172.60 at the beginning of 1957. This reflects a directed economic policy for utilization of oil revenues. Generally, the government's program is the best directed of all the major oil-producing and -exporting countries.

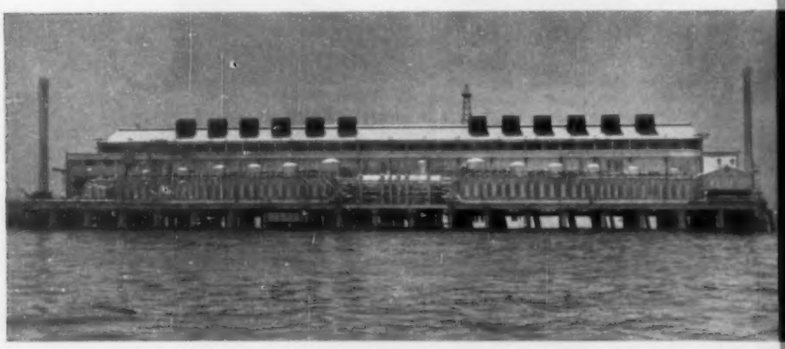
Three rather disturbing aspects of the gen-

APPROXIMATE DISTRIBUTION OF VENEZUELAN GOVERNMENT INCOME – 1956 ESTIMATE




TOTAL
Bs 4.374 MILLIONS
$ 1,314 "


■ The big gas repressuring plant in Lake Maracaibo's Tia Juana field, one of three, is solid evidence of the major organization Brown & Root maintains on a permanent basis in Venezuela.



An imposing array of heavy equipment, both land and marine, plus a major fabrication and maintenance yard on the lake shore, provides the Venezuelan oil industry with the standard of performance that is the hallmark of Brown & Root around the world.

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*keep 'em turning*
*to the right . . .*

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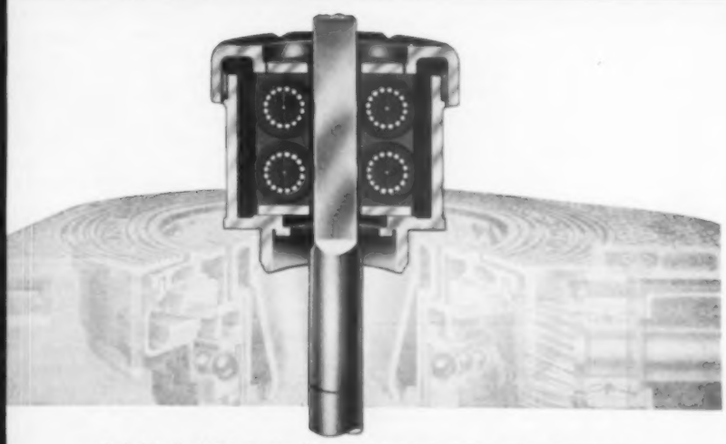
# ROLLER KELLY DRIVE BUSHINGS

Precision engineered and ruggedly constructed, Baash-Ross roller kelly drive bushings always operate smoothly and efficiently under extremes of torque and rotary speeds.

Key feature of this bushing is the assembly of tandem rollers—in both square and hexagonal models—with eight or twelve large diameter rollers, with non-friction bearings, in constant positive contact with the kelly faces. Kelly wobble is prevented and stability is assured.

Since the rollers always provide smooth, friction-free feeding, weight indications are accurate; damaging impacts to drill string and other equipment can be avoided.

Superior performance has made Baash-Ross kelly drive bushings preferred in the industry. For additional information write to P. O. Box 1348, Houston 1, Texas, or see the Composite Catalog.



Individually lubricated rollers rotate on precision roller bearings.

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AREA OFFICES:
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FOREIGN OFFICES:
New York, N. Y.; Greenock, Scotland; London, England; Paris, France; Maracaibo, Venezuela; Buenos Aires, Argentina.

eral legal situation comprise: (1) the continued regulation of internal prices at an artificially low level; (2) recent entry of the government into the steel, petrochemical, and natural-gas distribution industries; (3) the artificial exchange rate forced upon the oil companies.

**VENEZUELA—FOREIGN INVESTMENT IN OIL**
**(End of Year)**
**(Millions of Dollars)**

| | 1954 | 1953 | 1952 |
|---|---|---|---|
| United States | 2,096 | 1,827 | 1,655 |
| Holland | 921 | 884 | 866 |
| Great Britain | 405 | 407 | 402 |
| Canada | 16 | 17 | 17 |
| Spain | 12 | 12 | 12 |
| France | 1 | 1 | 0 |
| Others | 0 | 0 | 0 |
| Total | 3,452 | 3,149 | 2,953 |

Conversion Rate: $1—Bs. 3.09.

**VENEZUELA—GOVERNMENT EXPENDITURES**
**(Millions of Dollars)**

| Year | Income | Payments | Surplus (Deficit) | Treas. Res. End of Period |
|---|---|---|---|---|
| 1946 | 257 | 286 | (29) | 41 |
| 1947 | 385 | 389 | ( 4) | 35 |
| 1948 | 533 | 494 | 39 | 75 |
| 1949 | 595 | 587 | 8 | 83 |
| 1950 | 576 | 623 | (47) | 35 |
| 1951 | 681 | 688 | ( 8) | 29 |
| 1952 | 723 | 716 | 7 | 41 |
| 1953 | 761 | 722 | 39 | 72 |
| 1954 | 790 | 778 | 12 | 84 |
| 1955 | 900 | 897 | 3 | 87 |
| 1956 | 1,314 | 1,006 | 307 | 395 |

**VENEZUELA—GENERAL WHOLESALE PRICE INDEX**
**(1938=100)**

| Period | General Index |
|---|---|
| 1946 | 137.10 |
| 1947 | 155.68 |
| 1948 | 173.50 |
| 1949 | 164.61 |
| 1950 | 164.71 |
| 1951 | 173.63 |
| 1952 | 176.42 |
| 1953 | 170.92 |
| 1954 | 175.42 |
| 1955 | 176.50 |
| 1956 | 172.60 |

The first of these, the internal price level, is covered in other sections of this report. As may be seen, price levels of certain refined products—especially regular-grade gasoline—have been maintained at artificially low levels since 1945. The issue is a political gambit, and it is doubtful these levels will be changed in the near future. The prices are actually below cost, and result in an annual loss of about $15 million to the biggest distributor in Venezuela, Creole Petroleum Corp. As a result, only two companies, Shell and Creole, have developed complete internal marketing facilities.

Recent entry of the government into sectors reserved to private industry is less disturbing than might be supposed, since it is counterbalanced by (1) a technically sound government administrative corps for oil; and (2) the knowledge that, although Venezuelans probably could handle all aspects of the domestic oil industry on their own, they realize they could not handle the export end, which is vital to the industry. The government's reason for entering the petrochemical and gas field appears to be that the private companies were not doing it themselves; so government stepped in to fill the gap. There still is no indication the government will enter into direct competition in oil exploration, and in production and export—although the refining sector is less certain with the pending construction of a 40,000 b/d plant by the government at Moron.

The third aspect, discriminatory exchange rates, is the added cost of bolivares to an oil company there. The current exchange rate for the extremely "hard" bolivar is 3.33 bolivares per dollar if buying bolivares with dollars, and 3.25 per dollar if buying dollars with bolivares. However, for a number of years the oil companies have been required to sell to the Central Bank foreign exchange acquired from export of hydrocarbons, or other activities, to the extent of their need for bolivares. A decree to this effect, affirming the then current practice, was issued in 1944 (Decree 178 of August 15, 1944). By agreement between the Central Bank and the Finance Ministry (Hacienda)—to which the oil companies are not parties—such foreign exchange is acquired in U.S. dollars at the rate of 3.09 bolivares per dollar (about 32 U.S. cents per bolivar). Moreover, if the Central Bank is unable during any one year to sell all the dollars it has acquired from the oil companies, the price for such remainder is recomputed at the gold import rate of about 3.04 bolivars per dollar.

**VENEZUELA—OIL INDUSTRY PAYMENTS**
**(Millions of Bolivares)**

| | 1946 | 1947 | 1948 | 1949 | 1950 | 1951 | 1952 | 1953 | 1954 | 1955 | 1956 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Total Government Revenue** | 856 | 1,281 | 1,776 | 1,980 | 1,917 | 2,267 | 2,408 | 2,534 | 2,631 | 2,998 | 4,374 | |
| **From Oil Industry** | | | | | | | | | | | | |
| Direct Oil Payments | 489 | 692 | 1,066 | 1,120 | 961 | 1,366 | 1,440 | 1,514 | 1,502 | 1,710 | 3,041 | (Est.) |
| Per cent of Government Revenue | 57% | 54% | 60% | 57% | 50% | 60% | 60% | 60% | 57% | 57% | 70% | |
| Exchange Income in cash | 29 | 54 | 30 | 50 | 203 | 111 | 114 | 126 | 137 | 156 | 159 | (Est.) |
| Per cent of Government Revenue | 3% | 4% | 2% | 3% | 11% | 5% | 5% | 5% | 5% | 5% | 4% | |
| Total Cash Income from Oil | 518 | 746 | 1,096 | 1,170 | 1,164 | 1,477 | 1,554 | 1,640 | 1,639 | 1,866 | 3,200 | (Est.) |
| Per cent of Government Revenue | 60% | 58% | 62% | 60% | 61% | 65% | 65% | 65% | 62% | 62% | 74% | |
| Dollar Cost of Oil Payments | 158 | 224 | 345 | 362 | 311 | 442 | 466 | 490 | 486 | 553 | 984 | (Est.) |

**Note:** Oil-industry direct payments before 1950 include only royalties, income tax and customs duties.

**Labor:** Another factor influencing Venezuelan operations is the availability and cost of labor. Since the beginning of the industry about 1918, there gradually has been built up a body of labor which comprises the best in the world outside the United States from the standpoint of productivity and training. While the labor law requires 75% Venezuelan employees, the oil companies are manned almost 100% by nationals in the wage-earner category. There is a lesser number in the top-management category, but still substantial—bringing average employment to about 90% national.

Basic labor statute is the 1936 Labor Law, with subsequent amendments. It specifies length of vacation, profit sharing, etc., in detail. A strong union movement is closely supervised by the government. Collective contracts are signed which define terms for a considerable period. The latest was signed in 1956—covering the 1956-59 period.

At present, the cost of labor legislation is high—approximating 33%. Direct cash earnings of national oil workers approximate $4,500 yearly. Side benefits bring this to about $6,000 yearly. Among the benefits which must be paid by the employer are rest-day pay (payment for seven days for six days' work); 29 to 30 days vacation yearly; diverse premium payments for overtime, holiday, travel time to and from the job, "utiliadades" or profit-sharing equivalent to 16-2/3% year's pay in a lump sum, housing allowance, and similar items.

**VENEZUELA—GOVERNMENT INCOME BY SOURCE**

| Calendar Year | Oil Royalties | Oil Concessions | Income Taxes | Custom Duties | Liquor & Cigarettes | Exchange Income (Net) | Others | Total |
|---|---|---|---|---|---|---|---|---|
| | | | | Millions of Dollars | | | | |
| 1946 | 88 | — | 56 | 44 | 27 | 9 | 40 | 257 |
| 1947 | 141 | — | 66 | 72 | 31 | 17 | 69 | 385 |
| 1948 | 233 | — | 111 | 92 | 35 | 10 | 71 | 534 |
| 1949 | 194 | — | 173 | 103 | 40 | 16 | 83 | 595 |
| 1950 | 199 | — | 112 | 103 | 40 | 66 | 75 | 575 |
| 1951 | 280 | — | 151 | 106 | 46 | 36 | 84 | 680 |
| 1952 | 266 | — | 195 | 115 | 47 | 37 | 85 | 723 |
| 1953 | 267 | — | 221 | 114 | 48 | 41 | 90 | 761 |
| 1954 | 292 | — | 203 | 123 | 55 | 44 | 98 | 791 |
| 1955 | 335 | — | 235 | 132 | 58 | 50 | 117 | 900 |
| 1956 Est. | 383 | 313 | 284 | 149 | 61 | 51 | 126 | 1,314 |
| | | | | Percentages | | | | |
| 1946 | 31.9 | — | 21.8 | 17.1 | 10.5 | 3.3 | 15.4 | 100.0 |
| 1947 | 34.0 | — | 17.1 | 18.7 | 8.1 | 4.2 | 18.0 | 100.0 |
| 1948 | 40.4 | — | 20.8 | 17.2 | 6.6 | 1.7 | 13.2 | 100.0 |
| 1949 | 30.3 | — | 29.1 | 17.3 | 6.7 | 2.5 | 14.0 | 100.0 |
| 1950 | 32.0 | — | 19.5 | 17.9 | 6.9 | 10.6 | 13.0 | 100.0 |
| 1951 | 38.1 | — | 22.2 | 15.6 | 6.8 | 4.9 | 12.4 | 100.0 |
| 1952 | 34.1 | — | 27.0 | 15.9 | 6.6 | 4.7 | 11.7 | 100.0 |
| 1953 | 32.6 | — | 29.1 | 15.0 | 6.4 | 5.0 | 11.9 | 100.0 |
| 1954 | 34.2 | — | 25.7 | 15.6 | 6.9 | 5.2 | 12.4 | 100.0 |
| 1955 | 34.5 | — | 26.2 | 14.7 | 6.4 | 5.2 | 13.0 | 100.0 |
| 1956 Est. | 27.1 | 22.1 | 21.7 | 11.3 | 4.6 | 3.6 | 9.6 | 100.0 |

Conversion Rate: $1 = Bs. 3.09 for oil revenues; $1 = Bs 3.33 for other revenues.

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# PARAGUAY

## PHYSICAL DEVELOPMENT

**Exploration:** Recently interest in Paraguay has revived, after being dormant for several years. The government on July 27, 1956, opened the entire Chaco area to exploration. Two days later it granted 30 exploration permits to Elizalde B. Gonzales, covering the border with Bolivia between the towns of Esmeralda and Fortin Col. Eugenio Garay. Exploration rights given since include 750,000 acres along the Bolivian border in the Chaco area to International Products Corp., 625 Madison Ave., New York; a concession(s) covering the Santa Rosa area given to Carlos Casado Ltda.; and other concessions of unknown location to Commander Ramon Centurion, Cia. Goyelita Petrolera y Minera S.A. (composed of Argentine, Paraguayan, Chilean and U.S. capital), Cervasia Recaldo Cespedes, Abraham Wishievsky, Oscar Armando Gomez, and Amelio Martinez, the last in the Alto Parana area. The large number of applications led the government to conclude they were for speculative purposes and the government implied they would be cancelled promptly if no work were done. By decree of July 31 (No. 28,384) the government required a 300,000 guarani (U.S. $2,500) deposit before granting concessions.

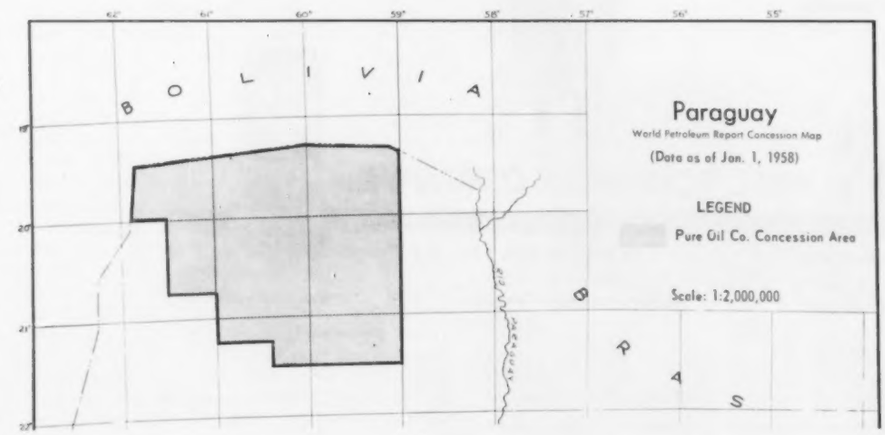
The largest concession granted so far was to Pure Oil Co., as indicated on the accompanying map. Pure must meet following terms in its new concession: drill 15,000 ft. and invest $1.5 million within 20 months; begin work within eight months; invest 10 cents per acre yearly for four years. After 20 months, company can surrender all or part of area. 50% must be surrendered from 3rd to 6th year, and 75% by 10th year—leaving about 3,750,000 acres. Taxes are limited to 50% of net. Royalty is 11%.

The principal exploration in the area was done by Union Oil Co. from October 4, 1944 through January 1, 1955 when the company gave up its concession over the Chaco area. The four wells drilled seemed to rule out the presence of a major strike in the area. According to Union, the results of geophysical and geological exploration and of the four wells drilled to date have demonstrated the presence of a thick section of marine organic shales of Devonian age in the western Chaco, and the actual presence of high gravity oil in some of these shales.

It also has been shown that closed structures of adequate extent can be found and mapped in the Chaco by means of the reflection seismograph.

All of Union's drilling, with the exception of one well, has been done in the western portion of the Chaco and such oil-bearing formations as were penetrated were tight and lacked reservoir sands. One well drilled in the eastern portion had evidences of high gravity oil with no reservoir. There are geological reasons for believing that a near-shore development of these same formations might exist in the eastern Chaco and that reservoir sands might be found in that region. The untested eastern portion is large enough to hold several basins the size of the San Joaquin Valley in California and the presence of oil-producing formations in any of these basins would be favorable for production.

The Paraguayan government was most cooperative to Union's exploration project throughout its entire history and relations with the people of the country in general were excellent. Labor relations likewise were excellent. The quality of the labor is good according to Union, and the labor laws of the country are quite reasonable and workable. The company concluded that the possibility of the hitherto untested areas of the Chaco, particularly the eastern portion, are still worthy of additional tests. These conclusions are "further enhanced by the size of the region involved, the very favorable nature of the contract, and the unusually good working conditions and public relations to be found in Paraguay."




**Transportation:** There is no oil production in Paraguay but a European-American group began in November on construction of a 10,000 b/d crude oil line from Bolivia's southeast border to Asuncion—plus a 3,000 b/d refinery at its terminus.

The contract has been awarded by the Paraguayan government to a group of companies headed by Cie. Fives-Lille, the French engineering firm. The 422-mi. pipeline will be built by Termec-Hardeman Venezuela S.A., of Caracas, under the supervision of Paul Hardeman, Inc., of Los Angeles. Comptoir Franco-Belge des Tubes S.A. will supply 6⅝ in. pipe.

Total cost of the over-all project is $11.8 million, with $720,000 of this payable in Paraguayan guaranis at the rate of 100 to $1. Credit terms call for payment in five to seven years at sliding interest, with 40% payable in the first two years. Construction is scheduled for completion in 18 to 24 months.

**Marketing:** A total of 251,116 bbl. of gasoline was imported into Paraguay during 1956—or some 700 b/d—70% by Esso Standard Oil Co. and 30% by Shell Oil Co. 1957 imports were about 1,570 b/d.

Esso of Argentina is soon to set up an Esso company incorporated in Paraguay, to take over all properties and functions of the Argentine company in Paraguay. Esso imports and distributes about 70% of the oil products sold in Paraguay. Esso is said to be pleased with the fair treatment from Paraguay, and foresees expansion ahead. Esso is completing new storage facilities at Asuncion which will ease a low-water transportation problem during part of the year, which adds to costs. During low-water season on the Paraguay River, products must be shifted to shallow barges for hauling up the river.

Oil product prices in Paraguay, under government control, are expected to rise still further after 20% increase in August. The last rise, following a shift to a single-rate, free exchange market for imports and exports, still leaves prices very low.

## OIL LAWS

Governing petroleum legislation in Paraguay is Decree 1,755 of June 8, 1940, as modified by Article 65 of Law of Colonization and

Homes of June 25, 1904, ratified in Art. 195 of Decree Law 120 of February 29, 1940. The petroleum law modified the provisions of the general mining legislation, as contained in Law 93 of August 24, 1914 and modifications in Law 698 of November 5, 1924.

All petroleum, including natural gas, is declared the property of the Nation which has inalienable rights to the subsoil. Oil or gas resources may only be exploited by the State or its appointed agency or through concessions granted to qualified persons.

Only the State may exploit helium wells, and if helium is discovered in an oil or gas well the State may expropriate same, paying the costs of drilling plus 15%.

Person (or entities) receiving concessions must declare themselves Paraguayans, or form a Paraguayan company, whatever the source of their capital may be. Any employee or director of any national government enterprise is declared ineligible to receive concessions.

The State reserves the right to specify the percentage and nationality of foreigners used in operations, and may limit or increase them. Scholarships must be given by concessionaires to Paraguayans to study oil operational techniques. The government reserves the right to contract service of foreign companies or technicians for oil exploration or development.

Concessions (both exploration and exploitation) do not confer any right of property above the oil discovered, but only the right to explore and/or develop for a specified time. The concessions must be rectangular in shape, except where natural land features make this impossible, and sides must bear a relation of 1 to 5 (*i.e.* width of concession area must be five times length, or vice-versa).

The government reserves the right to set aside areas as National Reserves, within which no concessions may be given. The duration of such reserves cannot exceed 10 years. All "sobrante" or excess area resulting from exploration concession applications is considered a Reserve, and may be developed only by the State or by "mixed companies" which are owned partly by the State and partly by private capital. These areas may not be given out to private companies or individuals for five years, after which time the original explorer of the area will have preference to same. If he does not indicate his interest the area becomes open to concession. Transfer of concessions is only possible with prior approval by the government.

Operations under the law are divided into two stages: exploration and exploitation.

*Exploration:* Applications must be presented in four copies to the Minister of Public Works on sealed paper, with preference given to applications in order of presentation. The application must be signed by the Secretary of the Ministry of Public Works and the applicant. It is circulated to the Division of Mines and Petroleum and to the Chief of Petroleum (Patron de Petroleos), thence to the Land Registry where title is certified.

Lands are divided into two classifications: (1) Lands not known to be "petroliferous," in which case the duration of the exploration concession is four years, renewable for four years more on application, if obligations have been met; and (2) Lands known to be oil-bearing or "petroliferous" at the time of application, in which case the duration of the exploration concession is two years, renewable for another two years.

The concessionaire must have a drilling rig installed by the mid-way point of his concession duration. One rig must be installed for every five "pertenencias." The obligation may also be fulfilled by investment in other exploration work equal to the value of the rig.

Concessions are given in "pertenencias" of 10,000 hectares (24,700 acres) each. A maximum of 30 such concessions may be given (for a total of 300,000 hectares, equal to about 741,000 acres).

Concessionaires must make semi-annual reports to the government, and keep government officials informed of important developments. No information on the concession, maps, etc., may be published without the concessionaire's permission.

The exploration concession may be terminated in any of several ways, including: expiration of concession duration; failure to perform the exploration work specified or complete stoppage of work for one year; voluntary renunciation of the concession by the concessionaire; or failure to pay the surface tax. Any time the concession is terminated the concessionaire is given the right to freely withdraw his equipment.

The exploration concession is not subject to any general tax, federal or municipal. Surface tax is imposed of 0.15 gold guarani per hectare annually beginning six months after date of concession decree.

*Exploitation:* The exploration concessionaire is guaranteed the right to an exploitation concession over the same area. Application for the exploitation concession must contain all available data necessary for the government to determine the extent of petroleum deposits.

Concessions have a maximum size of 2,000 hectares (about 4,940 acres) each. One concessionaire has the right to two such concessions for a total of 4,000 hectares. They must have the same shape (1:5) as exploration concessions.

Duration of the concession for exploitation is not less than 30 and not more than 50 years. No mention is made in the law of possible extension. Complete data on findings must be given the government by the concessionaire, but these cannot be released to the public without the concessionaire's permission.

Surface tax on the exploitation concession is 0.60 gold guarani per hectare annually.

Royalty is 15% maximum, with a minimum royalty of 12%, to be determined by the amount of production and its location. During exploration the concessionaire is given the right to produce on previous notice to the government, on payment a royalty of 20%. Royalty is payable in kind delivered i.f. at Asuncion or in cash at "world market prices prevailing during the previous month."

Among the miscellaneous rights of the concessionaire are: the right of surrender of any concession when desired; right to produce, transport, refine and sell production; right to install all necessary equipment; and the right to construct, acquire, possess and use such services as telegraph, telephone, railroad, road, docks, etc., subject to applicable laws.

All equipment not available within the country may be imported free of duty. Any production obtained remains free of any municipal or federal tax, or export duty, during the first 35 years.

The concessionaire must: freely admit government inspectors to wells and producing fields; pay contributions and royalties to which he is subject; take precautions against damage; plug abandoned wells in a satisfactory manner; and advise the government every time a well comes into production.

## NATIONAL FACTORS

Paraguay is a republic, known officially as the Republic of Paraguay. The Constitution was ratified August 4, 1940 and gives extensive rights to the executive, including the right to regulate economic activities. Head of the executive branch is the President, General Alfredo Stroessner, who was elected for five years on August 15, 1954. The President has extensive internal powers, including that of promulgation of laws and issuing of regulations thereto.

Regulatory body for the petroleum industry is the Ministry of Public Works.

In 1932, war broke out with Bolivia over the Chaco territory. It resulted in a victory for Paraguay, which received ¾ of the disputed territory. An aftermath of the war was the growth of the army's influence under Col. Rafael Franco, who installed a fascist-type regime which has continued to make its influence felt. The army's intervention in politics was based on the assumption that this would serve to stabilize the political scene. In alliance with the Colorado party, the military influence was responsible for most of the presidents who have been installed since 1936 and General Stroessner is the latest in a long line of army-Colorado rulers. Although previously Argentina (under Peron) held considerable influence over Paraguay, Brazil has been gaining in influence lately, especially with the new Foz do Iguacu bridge over the Parana, which gives Paraguay a new access to the sea. The stability of the country is little impaired by the frequent changes of leaders within the political sphere. The Army, with over 50% of the budget (including police), remains firmly in control, and past changes made little or no difference to the Union Oil Company of California during its 10-year period of operation.

**PARAGUAY—PRODUCT IMPORTS**
(Barrels)

| Product | 1957 Estimate | 1956 |
|---|---|---|
| Gasoline | 241,000 | 218,000 |
| Aviation gasoline | 39,000 | 34,000 |
| Kerosine | 87,000 | 72,000 |
| Industrial solvent | * | * |
| Benzine No. 1 | * | * |
| Diesel oil (regular) / Diesel oil (light) | 77,000 | 85,000 |
| Fuel oil | 112,000 | 76,000 |
| Lube oils | 17,000 | 14,000 |
| Totals, barrels | 573,000 | 499,000 |

**Note:** Esso imports and distributes 70% of oil products sold in Paraguay. It was announced during 1957 Esso Soc. Anonima Petrolera Argentina would set up soon a separate and independent outfit in Paraguay, taking over all properties and functions of the Argentine company in Paraguay.

*Included in gasoline.

*Attitude Toward Foreign Private Investment:* The government's attitude toward the United States is traditionally friendly. This extends to investments by private American capital, and the recent decree opening the Chaco to exploration was accompanied by a statement that the economic progress of the country requires investigation of possible subsoil resources—resources "which are destined to augment the spirit of Initiative in foreign and national capital investors." A law has recently been passed to encourage the investment of private capital from abroad. Under this Law No. 246 of February 25, 1955, private investments from abroad in form of currency or equipment (including patents) which contribute to "economic and Social development and . . . not requiring guarantees or exceptional benefits other than those granted under this law," will receive (1) exemption from customs duties on imports of machinery and equipment; (2) exemption from export duties on production; (3) exemption from taxes on new enterprises; (4) 25% reduction of income tax; (5) guaranteed remittance of profits and

capital at the rate of 20% yearly of registered capital; (6) exemption for five years from labor laws requiring a percentage of Paraguayan employees.

There are no known instances of expropriation within Paraguay. Guarantees governing expropriation and currency convertibility are available through the United States government.

The usual forms of business organization, including the corporation, exist in Paraguay. There are no limitations on the amount of stock in same which may be owned by foreigners. The Sociedad Anonima, equivalent of the American corporation, is not subject to any nationality requirement as regards its board or officers.

*Exchange Rate:* The unit of currency is the guarani, divisible into 100 centimos. During 1956 the guarani was devalued to one guarani equals 1.666666 U. S. cents. This rate was again changed during August 1957; and, as part of a broad program of economic stabilization, the government established a single exchange market with a single fluctuating rate for all transactions. Quantitative import restrictions and surcharges were removed. A tax of 15% was imposed on exports. A new par value will be established as soon as conditions permit. In the meantime, the rate for the guarani as of December 21, 1957, was just under one U. S. cent, or about .95 U. S. cent per guarani.

*Taxation:* The principal tax is the Income Tax, the first category of which applies to corporate profits or those from "mining" which includes petroleum. Rates on other categories run from 7% on income of one to 20,000 guaranies up to 21% maximum on income over 300,000 guaranis. The rate for corporations is a flat 17%. Allowable deductions include usual business expense of salaries, commissions, losses by fire or bad debts, depreciation of assets and taxes paid, such as the surface tax payable by petroleum operators. There is no depletion allowance.

*Labor:* In the labor force of perhaps 500,000, about 70% are engaged in agriculture, possible 20% in industry and commerce. There is some migration of skilled workers to Argentina, attracted by higher wages. Collective bargaining is conducted quietly, often with government assistance; agreements are frequently made industry-wide by the government. There is no labor code; wages, hours, working conditions, and labor-management disputes are subjects of government decrees. Social security benefits are extensive. Wages paid women are much lower than those paid men; however, government wage decrees and minimum wage settings have narrowed the gap in recent years. Despite efforts at price control, the cost of living in 1956 reached a level more than 7 times greater than that of 1948; general wage increases have not sufficed to prevent a decline of workers' real earnings.

Labor legislation is not extensive. Hours of work generally range from 48 hours per week down to 36 in dangerous or unhealthy occupations. Overtime rates are at time-and-a-half. As previously mentioned, wages are very low. Minimum wage rates are established by the Department of Labor and are generally exceeded. Wage rates for unskilled labor are about 50 guaranis daily in the vicinity of Asuncion. This is about 50 U. S. cents, and is considerably below the estimated 129 guaranis daily believed necessary in mid-1954 for a family of five persons. The result is extensive employment of more than one person within the family.

At least 95% of all employees must be Paraguayans, although this restriction is set aside often by the government for special cases. 90% of laborers must be native workers. END

### Oil Law Summary*

Subsoil owned by State. Local company must be formed. No restrictions on ownership.

**EXPLORATION: Duration:** 4 years, renewable for 4 years on lands not known to be "petroliferous." On petroliferous lands duration is 2 years, renewable for 2 years. **Drilling Obligation:** Rig installed by end two year period, or mid-point of concession duration. One rig installed per every 524,700 acres. Other exploration work may be substituted. **Area:** 24,700 acres. Maximum 30 concessions per concessionnaire. **Termination:** Concession terminated for exploration, failure to do work specified, voluntary surrender, or failure to pay surface tax. Concessionaire may freely withdraw equipment on termination. **Surface Tax:** 0.15 gold guarani per hectare per year.

**EXPLOITATION:** Conversion guaranteed. **Area:** 4,940 acres. Maximum 2 concessions per concessionaire. **Duration:** Minimum 30 years, maximum 50 years. No extensions. **Surface Tax:** 0.60 gold guarani per hectare per year. **Royalty:** 15% maximum. Minimum royalty 12%, depending upon the amount of production and location. **Surrender:** Anytime. **Rights:** May produce, transport, refine, and sell production. May install all necessary equipment and acquire all services necessary. **Import Duties:** Exempt. **Export Duty:** Exempt for first 35 years. **Obligations:** Must freely admit inspectors to wells and fields, pay contributions and royalties, avoid damages, plug abandoned wells, advise government everytime new well comes into production.

Source: *World Petroleum Legislation*, 604 Fifth Ave., New York 20, N. Y. (see p's 37-38)

# PERU

## PHYSICAL DEVELOPMENT

**Exploration:** Outstanding development was discovery in Peru's Montana region of about 500 b/d production in Maquia No. 1 in March 1957, by El Oriente Co., associated with a syndicate of three German companies, Deutsche Erdoel, Wintershall, and Elwerath—one of them partly owned by Jersey Standard. The well is on a southeast-northwest trending structure in the Tertiary red beds. Three previous wells were dry. The Maquia well had been drilled to 5,323 ft., but found the Agua Caliente sandstone of Lower Cretaceous age which encloses the oil sands in the Ganso Azul field. It was dry. After plugging back, the well yielded about 500 b/d of 38 API crude on a ¼-in. choke from 2,139 ft. to 2,162 ft. Bottomhole pressure was about 190 psi. Maquia No. 2 was completed at the end of June, at 3,360 ft. It struck oil at 2,132 ft., and produced about 600 b/d. Three offset wells are being drilled.

Twelve wildcats had been drilled in the Montana region of Peru's Amazon basin, and only Maquia No. 1 struck oil. The recent discovery came just in time to prevent interest in the area from declining. As it was, companies had given up substantial acreage. Despite the drilling which has been done, no deep sedimentary basin has been proved as yet in the Montana region.

**PERU—WELL DATA**

| | 1956 | 1955 |
|---|---|---|
| Exploratory wells drilled: | 31 | 24 |
| Oil producers | 8 | 7 |
| Gas producers | — | 1 |
| Dry | 23 | 16 |
| Development wells drilled: | 169 | 167 |
| Oil producers | 146 | 130 |
| Gas producers | 1 | 3 |
| Dry | 22 | 34 |
| Total completions | 200 | 191 |
| Total oil producers end of year | 3,486* | |
| Total wells pumping end of year | 2,907 | |
| Total wells flowing end of year | 363 | |
| Total wells abandoned during year | 7 | 3 |

*6,245 wells at end of year include producing, shut-in, injection, awaiting abandonment, and abandonments for IPC only.

Peru's offshore areas were opened up for the first time in 1957. Two companies, Petroleo Sullana (owned 40% by Union Oil Co. of California) took 45,837 acres; and Petrolera Peruana, a local company, took 56,837 acres.

The low level of internal product prices in Peru imposed by the government finally took its toll of Cia. Petrolera Lobitos. The company's profits had declined by 50% in the 1954-56 period, and exports also had fallen under the obligation to supply domestic consumption before export. International Petroleum Co. bought for $18 million a half-interest in the 140,000-acre concession in the Sechura of Cia. Petrolera Lobitos, wholly owned subsidiary of Lobitos Oilfields Ltd. International will operate the concession—spending $40 million by the end of 1961. Cia. Petrolera Lobitos will contribute $5.5 million. International guarantees one million barrels of crude yearly to Lobitos'

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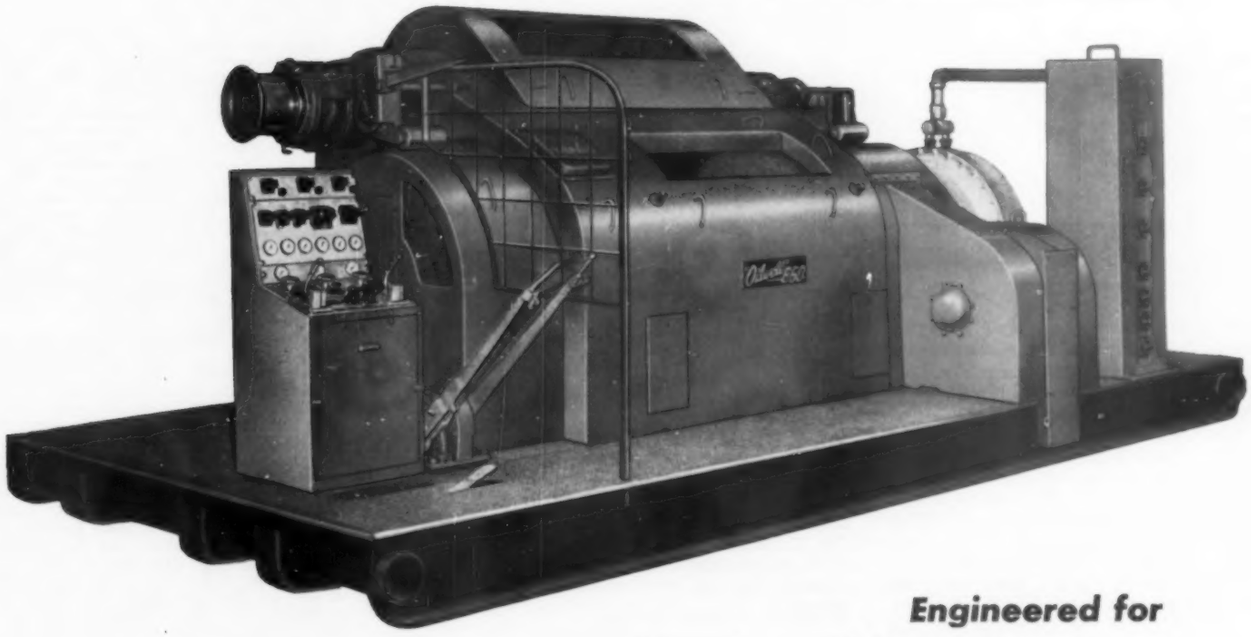

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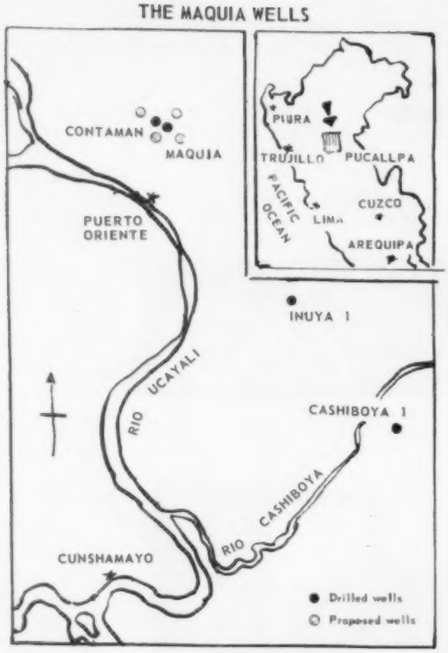


English refinery until 1978. Peruvian governmental approval has been received.

**Production:** New companies joined the ranks of producers in Peru; production rose accordingly, as shown in accompanying tables. During 1957, International Petroleum maintained production at about the same levels; Cia. Lobitos increased slightly. New producers came in during 1956, when Petrolera Peruana produced 513 b/d from the Mirador field; Empresa Fiscal reached 2,206 b/d, up 583 from 1955; and Peruvian Pacific, subsidiary of Cities Service and Richfield Oil Corp., produced 137 b/d from two wells. Petrolera Amotabe, independent, drilled two shallow wells and produced 1,495 bbl. during March 1957. Douglas Oil Co. produced a total of 20,732 bbl. from a single well, and abandoned seven others. Cia. Ganso Azul de Petroleo, producer in the Montana region, changed its name in 1957 to Transportes Amazonicos—serving as a holding company for operation of Cia. de Petroleo Ganso Azul Ltda.

**PERU—PRODUCTION AND DRILLING DATA**

| Name of Field | Year Discovered | Depth (Feet) | API Gravity | Production (B/D) 1956 |
|---|---|---|---|---|
| Agua Caliente | 1938 | 1,100 | 43.7 | 900 |
| Cope | 1938 | 650 | 34.0 | 4 |
| El Alto | 1910 | 2,000 | 37.7 | 5,920 |
| La Brea Parinas | 1888 | 3,000 | 36.6 | 28,050 |
| Lobitos: | 1902 | 4,500 | 37.5 | 10,320 |
| Area of joint development* | | 3,000 | 44.5 | 1,516* |
| Area "A"* | | 3,000 | 37.8 | 1,528* |
| Los Organos | 1946 | 1,800 | 34.7 | 1,455 |
| Zorritos | 1863 | 2,000 | 36.8 | 34 |
| Sector Peru | 1953 | 3,500 | 31.0 | 127 |
| Concesion Patria | 1943 | 2,000 | 42.0 | 1,714 |
| Tablazo | 1955 | 6,000 | 33.0 | 400 |
| Mirador | 1955 | 5,000 | 38.0 | 224 |
| Totals | | | | 52,192 |
| Amazon Basin Ucayali River | 1957 | 2,150-5,000 | | |
| | | Upper Cretaceous | 38-43.7 | |

*These two areas are extensions to the Lobitos producing area. They are being developed by International Petroleum Co. on 50-50 basis for Cie. Petrolera Lobitos. These figures represent IPC's share of production. The other half is included in Lobitos.

and operating river transportation for the company. Texas Gulf Producing Co. owns about 80% of Transportes Amazonicos; the remainder is held by Kendall Refining Co., Michigan Oil Co. (formerly Bay Refining Co.), and other interests.

**PERU—CRUDE-OIL PRODUCTION**
(Barrels)

| | |
|---|---|
| 1932 | 9,899,265 |
| 1933 | 13,257,318 |
| 1934 | 16,279,072 |
| 1935 | 17,066,555 |
| 1936 | 17,593,059 |
| 1937 | 17,457,195 |
| 1938 | 15,838,884 |
| 1939 | 13,547,762 |
| 1940 | 12,130,745 |
| 1941 | 11,935,402 |
| 1942 | 13,628,558 |
| 1943 | 14,654,499 |
| 1944 | 14,388,961 |
| 1945 | 13,744,216 |
| 1946 | 12,468,127 |
| 1947 | 12,763,808 |
| 1948 | 14,068,880 |
| 1949 | 14,796,091 |
| 1950 | 15,027,840 |
| 1951 | 16,109,896 |
| 1952 | 16,403,083 |
| 1953 | 16,999,770 |
| 1954 | 17,161,522 |
| 1955 | 17,245,534 |
| 1956 | 18,383,306 |
| 1957 (est.) | 19,235,600 |

**Refining:** There are only three refineries in Peru—the large 43,500 b/d plant of International Petroleum Co. and the two small plants listed in the accompanying table. Runs were up to 45,200 b/d in March 1957.

**Marketing:** Consumption patterns in Peru are distorted by the artificial price structure, as described in *World Petroleum Report 1957*. During 1957, the low price structure caused Cia. Lobitos to sell its interest to International, as previously discussed. Consumption is rising rapidly—cutting into amounts available for export.

**PERU—MARKETING AND FOREIGN TRADE 1956**
(Barrels)

| | Consumption | Foreign Trade Imports | Foreign Trade Exports |
|---|---|---|---|
| Crude oil | | | 2,768,734 |
| Fuel oils: | | | |
| Heavy industrial | 3,660,849 | 1,414,899 | |
| Diesel-gas oils | 2,205,792 | | 2,686,107 |
| LPGas | 51,876 | | |
| Kerosine | 1,994,613 | | 762,204 |
| Aviation gasoline | 284,363 | 577,425 | |
| Motor gasoline, premium | | | 979,059 |
| Motor gasoline, regular | 4,915,124 | | |
| Lubricating oils | 76,920 | 93,548 | |
| Asphalt | 206,619 | | |
| Wax | | 32,925 | |
| Grease (tons) | | 6,732 | |
| Others | 142 | 1,230 | |
| Total products | 13,396,305 | 2,126,759 | 7,909,606* |

*Includes 713,502 bbl. of a type unknown.
**Note:** Refinery runs in the 1st quarter of 1957 were 3,922,045 bbl.

## OIL LAWS

During 1957, no major changes occurred in Peru's oil laws as summarized in the accompanying table. Late in 1956, a supreme-court resolution opened the continental shelf to bids on terms substantially the same as those for the Coastal Zone. Maximum per applicant was 988,000 acres, with minimum cash bonus of 10 cents per acre for blocks of more than 24,700 acres.

**NATIONAL FACTORS SUMMARY**

**Income Tax:** 20% (special 50% tax for oil). **Political:** Stable. Attitude favorable toward foreign capital. **Labor:** Wage levels about $2.50 per day, skilled. Union strikes rare. Considerable trained oil labor available. **Currency:** Sole, equal to about 5 US cents. **Exchange:** No restriction on currency or profits remission.

## Oil Law Summary★

*Subsoil rights belong to State. Some private subsoil exists under concession to International Petroleum Co.*

**EXPLORATION: Duration:** 3 yrs. in Coastal Zone; 5 yrs. in Sierra Zone; 6 in Montana Zone. Two extensions grantable, 1 yr. each in Coastal Zone, 2 yrs. each in Sierra-Montana Zones. **Area:** 49,420 acres in Coastal-Sierra Zones, 123,550 acres in Montana. **Limit Per Concessionaire:** 20 concessions in any zone. Additional concessions may be obtained through competitive bidding. **Guaranty:** Deposit required, returnable when concession expired or renounced. **Minimum Investment:** Ranges from 15 soles per hectare (US $0.32 per acre) in Coastal and Sierra Zones, 2.50 soles in Montana. **Annual Surface Tax:** 2 soles per hectare (US $0.04 per acre) during original duration in Coastal Zone, payable annually. Rises to 4 soles during 1st extension and 6 soles during 2nd extension. Rates in Sierra and Montana ⅛ and ¼ of Coastal Zone, respectively. **Company Ownership:** Must organize Peruvian company, offering 30% of capital to Peruvians over 90-day period.

**EXPLOITATION:** May be received directly or over exploration area. **Duration:** 40 yrs. Coastal Zone, 45 yrs. Sierra Zone, 50 yrs. Montana Zone. Extensions, 20 yrs. in Coastal Zone, 25 yrs. in Sierra and Montana Zones. **Area:** Max. 25,000 acres in Coastal and Sierra Zones, 62,500 acres in Montana. **Limit Per Concessionaire:** 10 concessions. More may be obtained through auction. **Export:** Must satisfy domestic oil requirements at govt. prices before export. **Annual Surface Tax:** 21 US cents per acre in Coastal Zone, during first 5 yrs., rising to $2.10 per acre in 20th year. In following years declines to about 63.1¢ in 40th yr. Rates in Sierra and Montana Zones ½ and ¼ Coastal Zone, respectively. Surface tax reduced with increased production. **Bonus:** On conversion to exploitation, concessionaire must pay bonus of about 63.1¢ per acre in Coastal Zone. ⅛ and ¼ bonus payable in Sierra and Montana Zones, respectively. **Export Tax:** Export tax assessed at 20% f.o.b. value of crude oil or refined exports in Coastal Zone. Exports from Sierra and Montana Zones pay at rate 3% during first 10 yrs., rising to 10% during 40th yr. and thereafter, 1% export tax ad valorem assessed by National Unemployment Fund and Banco Minero del Peru, respectively. **Income Tax:** 50% of net profits in Coastal Zone. In Sierra and Montana Zones 10% 1st decade, 25% 2nd decade, 35% 3rd decade, 50% 4th decade, and thereafter. Export tax of 20%, plus 20% profits tax deductible. Export taxes (Banco & Unemployment) and import duties not deductible. **Depletion Allowance:** 15% gross in Coastal Zone. 25% gross for companies composed 2/3 of Peruvian nationals. May not exceed 50% net profits after deduction of profits tax and depletion. 27.5% gross value of production in Sierra and Montana Zones, up to 50% of net. Surface taxes during exploration and exploitation not deductible. **Import Duties:** Payable at full rates in Coastal Zone. Drilling and other equipment in Sierra and Montana Zones subject to only 50% duty. **Profit Remittances:** Exempted from any transfer tax in future. **Transportation, Refining, and Storage:** Concessions for pipelines, refining, and storage facilities obtainable for 40 yrs. duration, extendible another 40 yrs. on application.

★Taken from *World Petroleum Legislation*, 604 Fifth Ave., N. Y. 20, N. Y. (see p's 37-38)

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# MIDDLE EAST

## PHYSICAL DEVELOPMENT

**Exploration:** Exploration in the Middle East during 1957 was dominated by new exploration concessions received in the Neutral Zone, and in Iran by the Japan Petroleum Export Co., and Ente Nacionale Idrocarburi, respectively. The terms of these concessions are reviewed under the appropriate country section; however, they indicated new trends in established distribution of profits between government and company. Both these contracts were concluded by companies not having sufficient financial resources to put up a large initial bonus payment, but which were willing to give substantial concessions to the governments concerned in order to gain a foothold in the Middle East. In any event, their contracts enabled them to explore for relatively small cost. The contract obligations call for substantial outlays only when production has been found.

On land, the outstanding exploration developments were the discovery of the Khurais well by Aramco, which indicated a probable new field, and the discovery of oil in Dhofar, as covered under the appropriate country section.

**Afghanistan:** An oil discovery was reported during 1956 at Sar-i-Pul. A Swedish company did drilling under contract to the government, which does not permit exploration by private companies. The second well is now drilling. During late 1957 oil exploration began by the USSR in the north of Afghanistan.

**Aden:** British Petroleum did seismic work over Kamaran Islands during 1957, but had no plans for drilling. Geophysical activity was carried out over the Hadramaut by Petroleum Concessions Ltd., a subsidiary of Iraq Petroleum Co.—with no drilling plans announced.

**Jordan:** Jordan's first exploratory well, No. 1 Mishash, 50 miles east of Amman, by Edwin Pauley, in partnership with Phillips Petroleum Co., was halted below 8,500 ft. The well went through granite and sands alternately—with no oil shows and one gas kick. A second well will be drilled on the Ramullah anticline, near Jerusalem, which is a large structure about 14 miles long and 6 miles wide.

A 55-year concession was signed during November by J. Zimeri, who has farmed out the concession through an American group headed by J. W. Sparks, of Texas. ENI, the Italian government's oil company, reportedly applied for a concession in Jordan during 1957. It had not been granted by the year's end.

**Lebanon:** No exploratory drilling was done in 1957. The only existing concession in the country, held by Cie. Libanaise des Pétroles, reportedly was offered to Onassis, but the offer was not accepted. Late in 1957, an American group, American International Associates, reportedly put up $1.4 million for 53% of the company stock. The concession was due to lapse on August 10, but extension was requested.

**Yemen:** Yemen Deilmann Petrol, a German company, withdrew from Yemen during 1956. In 1957, Resources Development Associates was formed, and acquired a stock interest in Yemen Development Corp., which has a concession over 40,000 square miles in the northeastern two-thirds of the country. Yemen Development is negotiating to get part of the Tehama coastal strip which Deilmann gave up. Yemen Development is owned by Oil & Gas Property Management Inc., of Texas, and other USA participants. The company at present is seeking clarification of its concession agreement and establishment of it on a 50-50 basis.

**Qatar:** No exploratory wells had been drilled onshore in Qatar, as of November 1957. There are 36 flowing wells in the country, of which 10 are shut in. One seismic party is operating Principal interest is focused on the offshore areas, where Shell Petroleum Co. is continuing its offshore hunt. The company drilled two dry wells under its 1952 concession agreement. The first was three miles offshore from Doha, and was abandoned at 6,700 ft. The second was drilled in 1956 to 11,800 ft, at a location 40 miles off the east coast of Qatar. The third test was about to be drilled 30 miles northeast of the second and about 70 miles from shore, in 80 ft. of water, when the drilling platform was wrecked. A new drilling platform was brought out during 1957, and began operations during December. The company intends to continue exploration over the area during 1958.

**Production:** Production in the Middle East rose about 4.4% during 1957, in spite of the setback of the Suez crisis. The only country not affected was Iran, which raised its production level substantially. All the other countries either decreased or did not increase as much as anticipated.

**Refining:** Considerable expansion of refining capacity was accomplished in major producing countries such as Iraq and Kuwait. In Jordan a new company, Jordan Petroleum Refining Co. Ltd., was granted a 50-year concession by the government to establish a 6,500 b/d refinery. Reportedly, the refinery will be in operation toward the end of 1959. Capital of the company was divided into 800,000 shares, which were entirely subscribed; 710,000 shares were taken by Jordan shareholders, 10,000 by the Jordan government, 80,000 by other Arab nationals. Bids on the refinery were invited late in 1957.

Work progress on refining in Syria is covered in the Syrian section. The Aden refinery was expanded by a new million-dollar ships' bunkering terminal built by Standard Vacuum Co. The terminal has a storage capacity of about 350,000 bbl—with loading rate of about 4,200 bbl per hour. Operations at the Aden refinery dropped to nearly zero following the closure of the Suez Canal, but had recovered by April.

**Transportation:** During 1957, an $800 million oil pipeline of about 40-in. diameter and a capacity of about one million barrels daily was proposed. The project involved extensive political guarantees against its expropriation or

**ADEN—REFINING AND MARKETING**

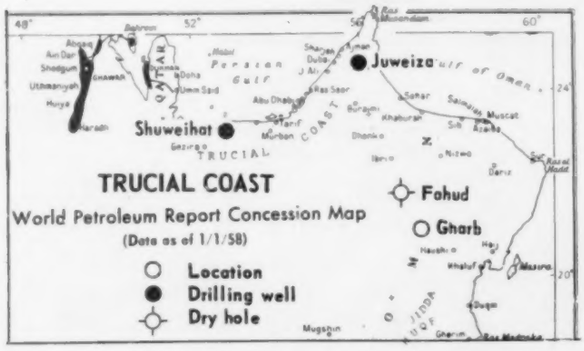
| | ADEN REFINERY OUTPUT (BP Ltd.) (Long Tons) 1957 (1st Half) | 1956† | DOMESTIC CONSUMPTION (Metric Tons) 1956 |
|---|---|---|---|
| Motor & other gasoline | 500,600 | 682,700 | 28,317* |
| Kerosines | 218,000 | 333,200 | 6,408 |
| Gas-diesel oils | 598,700 | 689,500 | 8,336** |
| Fuel oils | 1,639,800 | 2,697,000 | 14,000 |
| Lubricants | — | — | 2,095 |
| Totals | 2,957,100 | 4,402,700 | 59,156 |

*Consists of 1,000 avgas and 18,317 other gasolines.
**Consists of 5,338 gas oil, 1,000 diesel fuel.
†Crude charged was a daily average of 94,343 bbl. in 1956; 87,000 bbl. in 1955.

**MIDDLE EAST—CRUDE-OIL PRODUCTION AND RESERVES**

| | Production 1957 (Barrels Per Day) | Reserves (a) (Millions of Barrels) |
|---|---|---|
| Bahrain Island | 31,700 | 200 |
| Egypt | 42,100 | 275 |
| Iran | 723,700 | 32,000 |
| Iraq | 452,600 | 25,000 |
| Israel | 1,600 | 8 |
| Kuwait | 1,140,300 | 50,000 |
| Neutral Zone | 62,200 | 368(b) |
| Qatar | 141,000 | 1,500 |
| Saudi Arabia | 1,987,700 | 45,000 |
| Turkey | 5,700 | 65 |
| Totals | 4,588,600 | 154,416 |

a Estimated for each country as of the latest data available.
b From Eocene and Burgan sands only; Ratawi not known.




**QATAR—PRODUCTION AND DRILLING DATA**

| Name of Field | Year Discovered | (As of Nov. 1957) Flowing | Pumping | Depth (Feet) | API Gravity | Production (Barrels Per Day) 1957 (As of Nov.) | 1956 |
|---|---|---|---|---|---|---|---|
| Dukhan | 1940 | 36* | — | 6,500 | 41.5 | | 124,100 |
| Total barrels (year) | | | | | | | |
| Average b/d | | | | | | 162,200 | 45,300,000 |

* 10 shut in.

## REFINERIES IN BAHRAIN—1957

| *Name of Company* | *Plant Location* | *Crude Capacity* | *Type Plant* | *Cracking Capacity* |
|---|---|---|---|---|
| Bahrain Petroleum Co. | Bahrain, Persian Gulf [1] | 210,000 | SCA | 36,700TC |

[1] 19,500 b/d thermal reforming capacity, 15,700 b/d thermal cracking capacity and 21,000 b/d catalytic cracking capacity. Under construction: 10,000 b/d Platformer; complete 1957.

Capacities are in barrels per day. Key to type of plant: S—skimming; A—asphalt; C—cracking. Under cracking capacity to indicate type: T—thermal; C—catalytic. All data as of December 1, 1957.

nationalization, and died an early death with the flare-up of political disturbance in Syria and on the Syria-Turkey frontier. Some of the opposition was due to the Arab governments' desire for an all-Arab pipeline—linked with their reluctance to base their future development on a pipeline which had proved especially undependable in the case of Iraq, now suffering for the second time from a pipeline disturbance.

The Persian government proposed a line from Qum to Iskenderum, which would cost $450 to $500 million. The USA investment house of Allen & Co. made preliminary studies of the cost involved. This project must await final proving of the reserves at Qum, which may be less than originally thought.

A proposal for an all-Arab organization to own all future pipelines—not including existing lines—was put forth by Sheikh Tariki, head of Saudi Arabia's oil department. The plan would call for ownership by producing and transiting Arab governments under a "common-carrier" setup. Considerable opposition developed to the plan from oil companies, as would be expected, but also from governments of some producing countries which feared it would raise costs of their production and make Middle East crude more expensive in western European markets.

Transportation is a large part of Middle-Eastern oil thinking, and the Suez crisis heightened the importance of transportation to the area's oil future. Closure of the Suez Canal cut oil output in the Middle East by about half, for awhile; and the loss in receipts to countries concerned was in the neighborhood of $150 million. Western Europe got off well—despite a sharp rise in oil prices and a shortage of tankers, because most of her needs were supplied from the Western Hemisphere. Nevertheless, the crisis set back world consumption development by about one year.

Interest focused on the Suez Canal, where the Egyptian government has set up a national administration under Colonel Mahmoud Younes. Operations have gone smoothly; the canal's effective depth is now about 34½ ft, and this will be upped to 35 ft, in March. Colonel Younes indicated a program is under way to raise effective depth to 45 ft. This would be a total depth of about 53 ft, because 8 ft is necessary for tanker clearance. He indicated that 25% of revenues will be devoted to increasing the canal's depth and capacity.

During the year, first offshore oil in the Middle East was loaded into tankers at Ras Tanura. The offshore field is the Safaniya field, which began development on May 5.

## OIL LAWS

During 1957, the concession agreements in Jordan, in the offshore areas of the Neutral Zone, and in Iran were concluded. These contained the first substantial modification to basic structure of Middle East concession policy since institution of the Aramco agreement in 1950. The agreements provided for substantially larger government participation in Iran, as covered under the Iran section of this report, and in the Neutral Zone, as covered in NZ section herein. In Jordan, the concession was of the standard type; however, it contained the first clauses relating to conservation in the Middle East other than general provisions such as those calling for "good oil-field practice."

The strongest proponent of change has been the Saudi Arab government which, as covered in the Saudi Arabia section herein, wishes to apply the 50-50 division of net profits to all operations of the company, not only to production.

**LEBANON—CRUDE-OIL PIPELINE RUNS (Barrels)**

1st Half 1957, by Months

| | Tripoli—Receipts from Iraq Petroleum Co.* Average Per Day | Deliveries** Average Per Day |
|---|---|---|
| January | None | 11,060 |
| February | None | 7,574 |
| March | 41,136 | 43,633 |
| April | 65,659 | 66,457 |
| May | 66,998 | 77,667 |
| June | 67,472 | 51,264 |
| Six months average | 40,588 | 44,357 |

| | Sidon—Receipts from Trans-Arabian Pipe Line Co.† Average Per Day | Deliveries** Average Per Day |
|---|---|---|
| January | 334,820 | 307,936 |
| February | 301,508 | 332,918 |
| March | 348,032 | 330,439 |
| April | 353,125 | 340,153 |
| May | 352,102 | 380,037 |
| June | 348,330 | 320,040 |
| Six months average | 340,162 | 335,350 |

*Figures furnished by IPC in long tons and converted at rate of 7.6049 bbl equal one long ton. Crude furnished from stock on hand and by sea from Banias.
**Deliveries are to refinery and ships.
†Figures furnished by Tapline in barrels.

**REFINERIES AND CAPACITY—MIDDLE EAST**

| Name of Country | Number of Plants | Crude Capacity (Barrels Daily) | Cracking Capacity (Barrels Daily) |
|---|---|---|---|
| Aden | 1 | 120,000 | — |
| Bahrain Island | 1 | 186,500 | 36,700TC |
| Egypt | 3 | 74,000 | 6,500T |
| Iran | 2 | 463,000 | 102,000TC |
| Iraq | 4 | 45,630 | 18,000T |
| Israel | 1 | 87,000 | 23,500T |
| Kuwait | 1 | 30,000 | — |
| Lebanon | 2 | 20,500 | — |
| Saudi Arabia | 1 | 189,000 | — |
| Turkey | 1 | 7,000 | 3,000C |
| Total Middle East | 17 | 1,222,630 | 189,700 |

Under cracking capacity to indicate type: T—Thermal. C—Catalytic.

## NATIONAL FACTORS

1957 saw the severest strains yet to be placed on East-West relations in the Middle East. The invasion of Egypt by Israel—followed by the British and French invasion—to some degree brought a transfer of Arab hatred of Israel to Britain and France, and thereby to all western nations. It provided a rallying point for the second major political change in the Middle East, the entry of Russia into a position of influence. During the year a coup in Syria placed in power elements hostile to the West and friendly to Russia. An extensive trade pact, signed with Syria by the USSR, increased trade—which was begun also with Egypt, Lebanon, Iran, and the Sudan. The result has been to place Russia in a position of influence over the two major oil routes from the Middle East to Western Europe. These are the pipelines running to the Mediterranean, across Syria, and the Suez Canal. The year also marked the first entry of Russia into oil exploration in the Middle East with the conclusion of an agreement in Syria. Similar negotiations have been carried out in Yemen. The effort was to turn a great deal of exploratory activity toward areas outside the Middle East and more dependable sources of supply, such as the Sahara and Venezuela, where intensive oil development is under way. A side effect was an increase in storage capacity in Europe to enable her to meet such future emergencies. END

## *Lebanon*
## *Oil Law Summary*★

**EXPLORATION: Area:** 100 square kilometers, in rectangular form. No limitation on number of concessions per concessionaire. **Duration:** 4 years. Renewable twice for 3 years each time. First renewal conditioned on completion of works program. Second granted if concessionaire can prove it was impossible to gather adequate information previously. **License Fee:** 5,000 Lebanese pounds first 3-kilometers-square block; 1,250 pounds second to 5th block, 250 pounds additional blocks.

**EXPLOITATION:** granted at request of exploration concessionaire over all or part of exploration area. May cover larger area. **Royalty:** 5% on first 7,000,000 barrels production. 15% on second 7,000,000 barrels production. 7.5% on production over 14,000,000 barrels. Natural gasoline royalty 2.5% of field value. **Transfer:** Only with government permission. **Surrender:** Any time. **Cancellation:** Imposed if tax is not paid within one month, or transfer privileges violated. **Surface tax:** 0.05 pound per hectare during 1st and 2nd years, 2 pounds per hectare during 3rd year, 3 pounds per hectare during 4th and following years. **Duration:** 75 years. Extendible for additional 25 years. **Special provisions:** Government may deviate from above standard concession terms if necessary. 1955 concession granted to French group provided for government share of total net profit of 15% on production from 0 to 1 million tons (7,000,000 barrels) yearly, rising to 50% on production of 8 million tons or over per year.

★Source: taken from *World Petroleum Legislation*, 604 Fifth Avenue, New York 20, N. Y. (see p's 37-38)

**LEBANON—CRUDE-OIL SHIPMENTS FROM SIDON BY TAPLINE**
(Barrels Per Day)

| To: | 1956 | 1956 % |
|---|---|---|
| USA | 24,141,897 | 20.56 |
| Italy | 30,095,294 | 25.63 |
| Germany | 12,951,662 | 11.03 |
| Holland | 11,636,534 | 9.91 |
| France | 11,190,330 | |
| Belgium | 5,800,654 | |
| Spain | 6,305,569 | |
| Sweden | 1,796,559 | |
| England | 129,164 | |
| Canary Is. | 2,289,732 | |
| Trieste | — | |
| Canada | 10,978,970 | |
| Yugoslavia | 105,680 | |
| Totals | 117,422,140 | |

Note: Tapline deliveries of crude from Sidon during October 1957 were 394,367 b/d—a new high. Previous high was 380,038 b/d during May 1957. Deliveries for the 1st 10 months of 1957 averaged 344,390 b/d.

**MIDDLE EAST—ESTIMATED CONSUMPTION OF PETROLEUM PRODUCTS**
(Crude-Equivalent Basis—Thousands of Barrels Per Day)

| Country | 1957 | % Change 1957 Over 1956 |
|---|---|---|
| Aden | 72 | + 1.4 |
| Bahrain Island | 28 | — |
| Egypt | 98 | — 2.0 |
| Iran | 96 | +17.1 |
| Iraq | 33 | + 3.1 |
| Israel | 33 | +10.0 |
| Kuwait | 33 | +10.0 |
| Saudi Arabia | 56 | + 1.8 |
| Syria and Lebanon | 27 | + 3.9 |
| Turkey | 37 | +12.1 |
| Others | 3 | — |
| Total Middle East | 516 | + 7.0 |

# EGYPT

## PHYSICAL DEVELOPMENT

**Exploration:** The principal exploring company in Egypt, Sahara Petroleum Co.—owned by Continental Oil Co., The Ohio Oil Co., Cities Service Co., and Richfield Oil Corp.—continued its exploration at a diminished rate during 1957—with no discoveries made. The company retired from Egypt during the Suez crisis, and re-entered early in 1957; but it is now running only one rig.

A new company formed during 1957 is Eastern Petroleum Co.—owned 51% by International Egyptian Co., 29% by the Egyptian Cooperative Petroleum Socy., and 20% by the new General Petroleum Authority, the government's agency. About the same time it was announced Sahara Petroleum Co. had been given a 60-day extension of the surrender obligation on ¼ the concession area. Following the 60 days, Sahara surrendered 25% of its acreage.

By Law 135 of 1956, later amended by Law 332 of 1956, the General Petroleum Authority was formed to manage the government's oil interests. In 1957, the 63 exploration areas which previously had been granted to Shell and Socony Vacuum were granted to the General Petroleum Authority.

During 1957, the government announced a discovery by Eastern Petroleum Co., at Abu Rodeis, on the Sinai coast. The well flowed 120 bbl per hour, on initial test, from 8,376 ft to 8,840 ft. First discovery in this area was No. 1 Abu Rodeis, 240 ft away. Location is on the west coast of Sinai, across the Gulf of Suez from Ras Gharib field. Eastern Petroleum took over International Egyptian Co.'s Belayim and Feiran fields on Sinai. Petrofina and the Italian government's AGIP have an interest in International Egyptian.

**Production:** Egyptian production bounced back rapidly after the Suez crisis—during which it had fallen to almost nothing. By the end of November 1957, it was up to over 34,000 b/d. Mr. Mattei, head of ENI, stated it is expected to reach 40,000 b/d by the end of 1958.

**EGYPT—PRODUCTION AND DRILLING DATA**

| Name of Field | Year Discovered | Depth (Feet) | API Gravity | Production (Barrels Per Day) 1956 |
|---|---|---|---|---|
| Asl | 1948 | 2,870-3,870 | 22 | 3,204 |
| Belayim | 1955 | 5,100-8,700 | 22-23 | 5,100 |
| Feiran | 1949 | 6,800 | 26 | 500 |
| Gemsa | 1908* | 400-2,000 | 41 | — |
| Nurghada | 1913 | 700-2,500 | 22-30 | 779 |
| Ras Gharib | 1938 | 1,200-2,500 | 25-26 | 21,589 |
| Ras Matarma | 1948 | 1,940-3,200 | 17-18 | 327 |
| Sudr | 1946 | 1,500-3,100 | 19-23 | 5,886 |
| Average production, b/d | | | | 37,385 |

*Field produced 1,591 bbl. in one week in Jan. '56 for Egypt's road construction.

**Transportation:** Following nationalization of the Suez, canal operation was taken over by an Egyptian Suez Canal Authority, headed by Colonel Mahmoud Younes. The canal has operated smoothly—with few delays. Average of ships going through has been about 45 per day—nearly the same as before nationalization. In a recent visit to the USA, Colonel Younes stated the canal would continue to be improved. Three programs are under way. The first called for deepening the canal to its 34½-ft effective depth during December 1957. It will be deepened to 35 ft by March 1958. During the third stage, another foot will be added to depth during following years.

It has been reported, further, that a proposal was made by the Egyptian government to several companies — including Getty Oil Co., Ralph M. Parsons Co., and Onassis Shipping Lines—to construct a 100-mile pipeline along the canal—permitting large tankers to lighter at the bottom of the canal, make the canal transit, and thereafter load at the other end. No action has been taken on the proposal, and it is doubtful this would be economic in any case.

No new pipelines were added to Egypt's system during 1957, other than those covered in *World Petroleum Report 1957*. A comprehensive pipeline extension was proposed, however, by the government in 1957 to link Cairo and Alexandria, and to make these cities principal oil-storage areas with distribution centers throughout the delta.

**Marketing:** The 6-year price dispute between the Egyptian government and oil-marketing companies was settled during 1957. Agreements were signed between the government, Esso Standard, and Caltex (Egypt) SAE. Esso received about two-thirds of the $2 million it had claimed, and Caltex about half of the $6.16 million it had claimed. No announcement was made concerning Shell Oil (Egypt), which along with Anglo-Egyptian Oilfields Ltd. had been sequestered by the government.

The country has become increasingly dependent on the Soviet bloc for refined imports, especially kerosine and crude oil. Under barter agreements exchanging Egyptian cotton for oil, 390,000 tons of kerosine were to be imported during the last half of 1956, although at the beginning of 1957 delivery had still not been completed of the 600,000 tons (about 4.2 million barrels) of crude deliverable under June 30, 1956 agreement with the USSR and Romania.

**EGYPT—DOMESTIC CONSUMPTION & IMPORTS**

| | CONSUMPTION (Long Tons) | | IMPORTS (Metric Tons) | |
|---|---|---|---|---|
| | 1956 | 1955 | Jan.-Sept. 1956 | '56 Qtr. July-Sept. |
| Crude oil: | | | 689,053 | 345,759 |
| Saudi Arabian | | | 143,511 | 62,426 |
| USSR | | | 255,062 | 142,823 |
| Other Asia | | | 290,480 | 140,510 |
| **Products:** | | | | |
| Gasoline | 290,000 | 275,000 | 24,162 | 14,692 |
| Kerosine | 860,000 | 815,000 | 297,869 | 108,691 |
| Lube oils | — | — | 35,213 | 10,976 |
| Fuel oil | 2,070,000 | 2,000,000 | 468,696 | 174,889 |
| Diesel oil | 230,000 | 225,000 | 31,453 | 14,042 |
| Gas oil | 200,000 | 175,000 | 61,069 | 35,356 |
| Coke, pitch, asphalt, etc., others | 185,000 | 160,000 | 1,687 | 818 |
| Totals | 3,835,000 | 3,650,000 | 1,609,202 | 705,223 |

**Note:** For prior years, World Petroleum Report 1957 has figures on production, imports, exports, crude runs, and consumption.

**EGYPT—CONCESSION SUMMARIES***

The Minister of Industry is empowered by special law to grant a concession for exploration and exploitation on such terms as he may wish, (Art. 50 and 51 of Law 86 of 1956, amending Law 66 of 1953). Some of these terms are contained in the concession contracts granted to Conorada Petroleum Corp. by Law No. 54 of 1954, and to Egyptian Exploration Oil Co. by Law No. 291 of 1954. The principal provisions of these contracts are: *Duration*: 30 years, renewable for 30 years. *Area*: 75,000 sq. mi. Must surrender 25% at end of third year and another 25% at mid-sixth year. *Rental*: None for 12 years; thereafter 25,000 Egyptian pounds yearly per 400-square-kilometer block. *Minimum Expenditure*: $3 million during first 3-year period, $5 million second three years for Conorada, $900,000 and $1.3 million for Egyptian Exploration, respectively. $50,000 per block of 400 square kilometers retained yearly during 7th through 10th year, and $60,000 yearly in 11th and 12th year; 25,000 pounds ($75,000 approx.) yearly thereafter. Must begin drilling before expiration of 4th year. *Royalty*: 15% during first 10 years; thereafter 25%. After thirtieth year government may receive 50% net profits in lieu of royalty. *Government Purchase*: Government has right to purchase up to 20% production at 10% under royalty price.

A separate contract was granted to General Petroleum Corp. under Law 149 of 1957 covering the 63 areas previously explored by Shell and Socony Vacuum. The principal provisions of this concession are: *Duration*: 30 years, renewable for 15 years. *Annual Rent:* Exempt

**REFINERIES IN EGYPT—1957**

| *Name of Company* | *Plant Location* | *Crude Capacity* | *Type Plant* | *Cracking Capacity* |
|---|---|---|---|---|
| Anglo-Egyptian Oil Fields Ltd. | Suez [1] | 44,000 | SCA | 6,500T |
| Raffinerie de Petrole du Government | Suez [2] | 20,000 | SA | — |
| | Cairo [3] | 10,000 | S | — |
| | Total | 74,000 | | 6,500T |

[1] 4,000 b/d thermal reforming capacity. A 2,300 b/d Platformer under construction completed end of 1957.
[2] 20,000 b/d distillation unit is planned for construction.
[3] To go onstream end of 1957.

Capacities are in barrels per day. Key to type of plant: S—skimming; A—asphalt; C—cracking. Under cracking capacity to indicate type: T—thermal. All data as of December 1, 1957.

## Oil Law Summary★

**EXPLORATION:** Duration: Reconnaissance fixed in each case by govt. Prospecting, 1 yr.; 8 renewals guaranteed. **Area:** Max. per concession, about 38 sq. mi. (in Western Desert to 1958, 154 sq. mi.). Number per concessionaire, unlimited. **Ownership:** Though govt. agency conducts all petroleum activities, concession bids accepted by special agreement. Areas reverted to govt., or areas not applied for, annually placed at public auction; in event of parity, Egyptians have preference. **Transfer:** Not permitted. **Annual Rental:** US $71.75 per sq. mi. Renewal rentals per concession (after 4 yrs.) $14,350, 5th yr.; $21,525, 6th—with $7,175 annual increase until drilling begins. **Royalty:** Upon conversion of 1st half mining lease to exploitation, 15%; 25% in 2nd half provided 1st half has been applied for. **Drilling Obligation:** License extension beyond 4 yrs., requires continuous operation of at least one drilling outfit during 4th yr. unless operator already has two active drilling rigs in other prospection areas.

**EXPLOITATION:** 1st 50% exploration area guaranteed subject to special drilling, royalty, and rental conditions; 2nd 50% guaranteed upon application therefor and conversion of 1st 50%. In general, mining lease issuable only to holder of previous prosection license. **Duration:** 30 yrs.; renewals for max. 15 yrs.; thereafter by agreement with govt. **Area:** Same as prospection. **Fiscal and Royalty:** Western Desert to 1958: 10% royalty plus $1.81 per acre rental for first half prospection area when converted to exploitation; second half, royalty increases to 16.66% with no rental change. All others, 15% royalty for 1st half, 25% for 2nd—plus $2.90 per acre rental both halves. Rental refunded if equals or exceeds royalty. Royalty on renewal, 25%. **Income Tax:** 17%.

★Taken from *World Petroleum Legislation*, 604 Fifth Ave., N. Y. 20, N. Y. (see p's 37-38)

for 6 years. *Area*: Relinquish 25% in first three years, and another 25% by the end of 6th year. After that may retain only 10 areas, paying 25,000 pounds each. *Expenditure*: Must spend at least 900,000 pounds during first three years, rising to 1.5 million pounds during following three years, and 50,000 each area held after sixth year. *Drilling*: Must begin drilling during second year. Must keep six rigs active, after third year. *Royalty:* 27%. Government may receive 50% of company's net profit, if that is larger than rental plus royalty. *Stock*: Company must give 16% of capital stock to government without pay. *Tax*: No tax exemptions, no customs exemptions given.

*Source: *World Petroleum Legislation*, 604 Fifth Ave., New York 20, N. Y.

### NATIONAL FACTORS

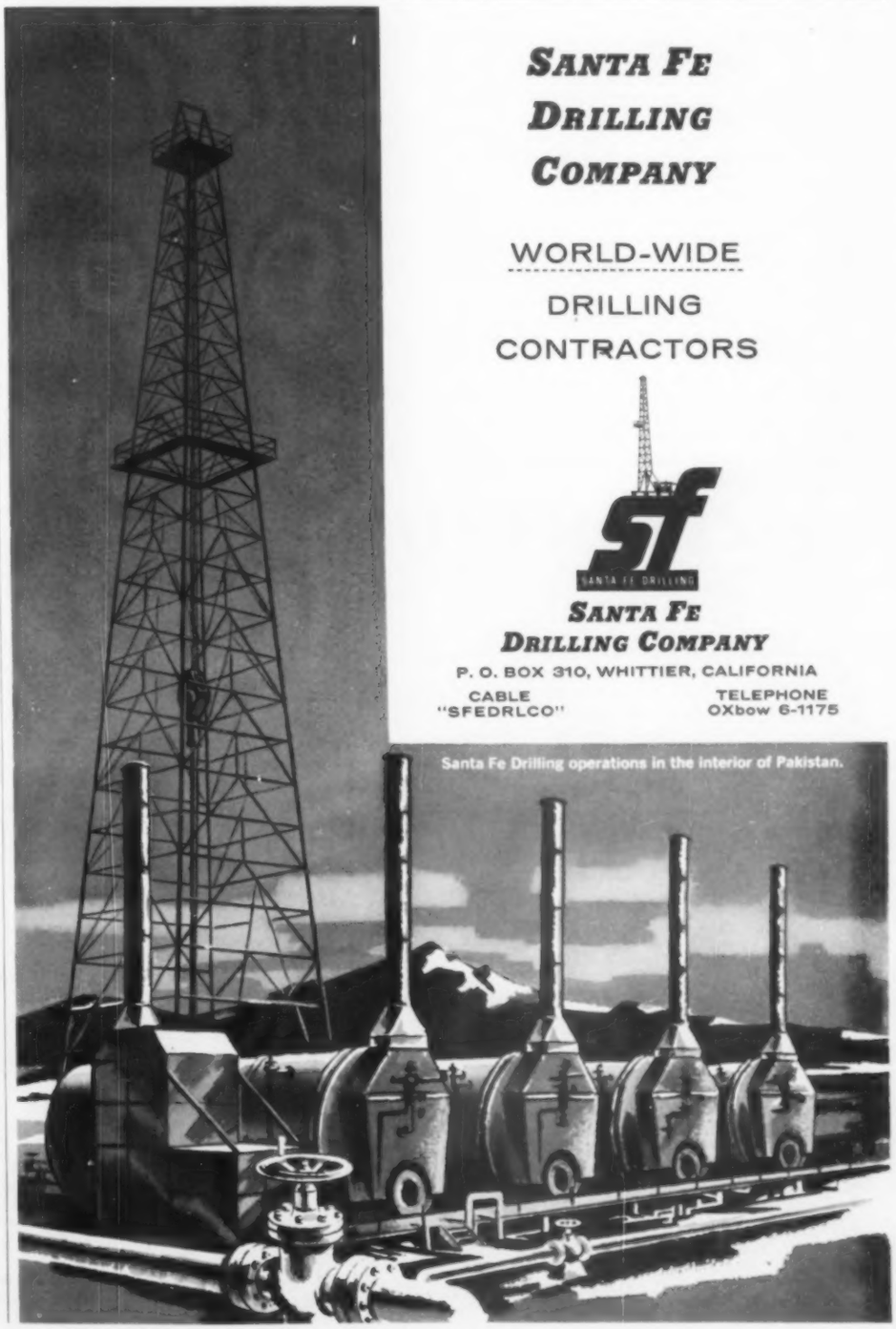
Several disturbing trends have occurred in Egypt. The first was, of course, the nationalization of the Suez Canal. This was accompanied by a series of "Egyptianization" laws. This was in addition to the sequestration of assets belonging to British, French, and Austrian nationals promulgated, November 1, and included Anglo-Egyptian Oilfields. These are still sequestered by the government.

The eventual aim of the government may be complete nationalization of industry or, in any case, greatly increased activity by the government in fields usually reserved to private enterprise. In this regard, the government announced during 1957 that formation of a 100% State-owned exploration company was being contemplated. The government also formed the General Petroleum Authority, an autonomous body with an independent budget under the supervision of the Minister of Industry.

Functions of the Petroleum Authority include: (1) managing the government refinery and all other public establishments engaged in the production of petroleum and its byproducts; (2) performing all activities related to the exploration for petroleum as well as its production, purchase, refining, selling and transporting; (3) the authority is entitled to participate in the capital of other establishments engaged in similar activities; (4) the authority expresses its views on matters submitted to it by the Minister of Industry concerning prospecting licenses and exploitation leases.

The authority is managed by a board of directors which has been granted a large degree of flexibility. For this reason, the authority is not restricted by the normal administrative and financial ordinances.

**Exchange:** Repatriation of capital and profits is governed by Law 156 of 1953, as amended by Law 475 of 1954. Foreign capital may be repatriated after five years at up to 20% yearly under the law, although it may be repatriated at any time after one year from investment if "practical difficulties are met for its investment." Profits are freely remittable abroad in the same currency as investment (Art 3). Companies are given specific right to transfer profits from investments, and employees may transfer abroad up to 50% of their salaries paid END

# ISRAEL

## PHYSICAL DEVELOPMENT

**Exploration:** Principal development during 1957 was a discovery during June at Brur 2, about one mile south of Heletz field. This was the second discovery of oil in Israel, the first was at Heletz during September 1955. On 24-hour test Brur flowed 280 barrels on 1/8-inch choke. It found 15 feet of pay sand just below 5,000 feet, equivalent to the Nubian sandstone which produces at Heletz.

Current interest is being shown in the deep test being drilled near Sodom in the Jordan valley by Lapidoth Israel Petroleum Co. Ltd. and Israel Oil Prospectors Corp. Ltd., now drilling below 8,000 ft. in stratified salt beds. Considerable difficulty has been encountered in penetration of the salt bed and fishing jobs are frequent.

Judean Petroleum Co. is drilling below 2,500 ft. on a deep test on the Judean anticline near Jerusalem.

On the coastal plain, Lapidoth Israel Petroleum Co. Ltd. and Israel Oil Prospectors Corp. Ltd. are drilling a Jurassic test in the Heletz oil field. This well, designated as Heletz 22, is situated on the east side of the structure. It is drilling below 6,000 ft. beneath the principal oil-producing horizons which occur in two sandstones in the base of the Upper Cretaceous system.

A series of 13 deep exploratory tests on major surface and gravity structures in Israel have proved unsuccessful to date with the exception of Heletz. During 1956 five deep holes were drilled in the coastal plain with a total footage of 40,952 ft.

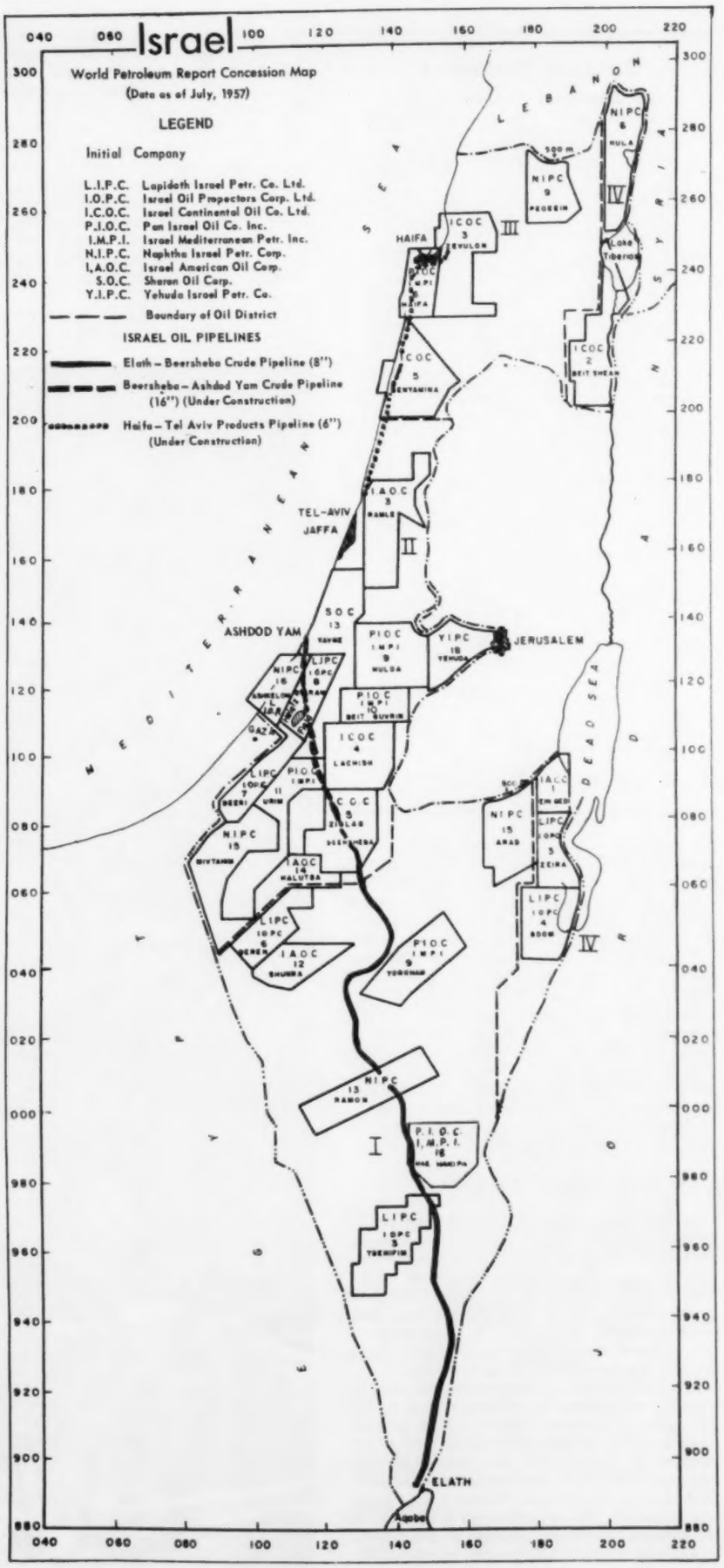
**Production:** The Heletz field, and Brur, are currently producing about 1,600 b/d. 1957 production is estimated at 1,644 b/d. The fields are about drilled up now, and no further sharp increases are expected from these areas.

**Transportation:** In April a 150-mile, 8-inch pipeline was completed from the port of Elath on the Gulf of Aqaba to Beersheba. It has a capacity of 17,000 b/d. It was extended by 16-inch pipe to Ashdod Yam on the Mediterranean coast. There are presently several other pipelines under consideration and construction, as indicated on accompanying maps.

A proposal for a large pipeline to flow from the Gulf of Aqaba to the Mediterranean, supplanting in part the Suez Canal, was reportedly proposed during 1957 but no commitments were made.

**Refining:** The Consolidated refinery at Haifa has been operating at about 25% capacity and during 1956 runs were around 22,000 b/d. New equipment has been installed to increase gas supply to the nearby chemical plant for manufacture of fertilizers. A 60-mile, 6-inch products pipeline for carrying 6,000 b/d gasoline is being planned, from Haifa refinery to Tel Aviv.

**Marketing:** During 1957 the last two major companies marketing in Israel, British Petroleum and Shell, withdrew and reportedly sold their marketing organizations for $14 million to independent interests. The other two major companies in the country, Esso and Mobil, sold their installations in March 1955 and at the end of 1956 respectively. The disposal of the Haifa refinery has not yet been decided.



### OIL LAWS

By amendment to the basic petroleum law of 1952, oil companies and drilling contractors are exempt from sales and excise taxes on such local materials as cement and tires bought for oil exploration and development. Drilling contractors are also exempt under the new laws from customs duties, which until now were granted only to companies holding oil licenses.

### NATIONAL FACTORS

There were no changes in the national factors mentioned in *World Petroleum Report—1957* during the past year. Oil has become increasingly important to the government, and realization has grown that the $38 million per year which Israel must pay for oil imports makes such sufficiency in oil a major need. Present market demand, about 25,000 b/d, is an annual consumption of 5.21 barrels per person yearly. Current population increase . . . will swell annual petroleum requirements about 2,750 b/d. This does not include the accelerating requirements of the nation's economy, due to highly mechanized agriculture and development. These will probably double Israel's demand for oil during the next 8 years. In the opinion of Israel authorities, a major reserve of 90 million barrels is urgently needed; this would represent a 10-years' supply of current crude requirements.

Despite the need for oil investment, the government's participation in oil continues to grow, thereby discouraging private investment. Formation of a national oil exploration company has been under consideration, and M. Bentov, Minister of Development, recently stated the government is engaged in formation of such a company with shares to be offered to the public. END

## Oil Law Summary★

*Subsoil rights belong to govt. No private subsoil.*

**RECONNAISSANCE:** Permit available for preliminary investigation, not including drilling. No fees payable. Guaranty bond required. No duration specified.

**EXPLORATION:** Duration: 3 yrs. 1 extension of 4 yrs. possible, subject to govt. approval. **Area:** 98,840 acres per license. Max. per concessionaire, 247,104 acres or three concessions in one district. **Drilling Obligation:** Begin within 2 yrs. Continue with no interruptions longer than 4 months. Drilling on one license in district takes care of others in that district, until oldest license is 5 yrs. old. **License Fee:** Annual fee assessed, equivalent of 2¢ per acre. **Work Obligation:** Begin exploration within 4 months. Submit complete confidential report when concession surrendered.

**EXPLOITATION:** Guaranteed right of conversion from exploration concession to exploitation lease of the same area. Otherwise subject to competitive bidding. **Duration:** 30 yrs. Renewable for 20 yrs. **Production:** Must begin within 3 yrs. May not be interrupted more than 2 yrs. **Area:** 62,500 acres. Max. per concessionaire in one district, 17,500 acres. Max. length may not exceed 10 times width. **Royalty:** 12½%, in cash or in kind. Min. royalty first concession year, 2 bbl oil. Rises to 16 bbl in 5th and succeeding years. This is based on 250 acres of concession area. In dollars, varies from min. $1,250 for max. lease size to $10,000 in 10th yr. **Depletion Allowance:** 27½% of gross, up to 50% net. **Marketing:** Concessionaire may be required to supply Israel's oil requirements at market prices. **Development:** Must begin in 6 months, and continue thereafter. Commercial production must be obtained in first 3 yrs. or lease expires. **Surrender:** Any time on one month's notice. **Customs Duties:** Concessionaire exempt. **Transfer:** With govt. permission only. **Guaranty Bond:** Not specified, must be posted.

★Taken from *World Petroleum Legislation*, 604 Fifth Ave., N. Y. 20, N. Y. (see p's 37-38)

**ISRAEL—PRODUCTION AND DRILLING DATA**

| Name of Field | Year Discovered | Wells Flowing (As of Aug. '57) | Depth (Feet) | API Gravity | Production (Barrels Per Day) 1957 (As of Aug.) | 1956 |
|---|---|---|---|---|---|---|
| Heletz | 1955 | 18 | 4,900-5,600 | 32.0 | 1,400-1,500 | 404 |
| Brur | 1957 | | | | 170* | |
| Total barrels | | | | | 600,000** | |
| Average production, b/d | | | | | 1,600 | 404 |

*Choked in. **Estimate.
Reserves estimated at eight million barrels.

**REFINING AND MARKETING**

Israel's current production of about 1,600 b/d from 18 wells at Heletz provides about 8% of crude requirements. Refinery runs at Haifa are more than 31% heavy fuel oil, 20% diesel, 17% kerosine, and 15% gasoline.

**ISRAEL—EXPLORATION & WELL DATA**

| | 1957 As of Aug. | 1956 |
|---|---|---|
| Field geological mapping (party-months) | — | 3 |
| Seismic party-months | | 12 |
| Gravity-meter party-months | | 12 |
| Wells completed: | | 13 |
| Dry holes | | 11 |
| Still drilling end of year | 1 (8-1-57) | 3 |
| Footage drilled: | | 205,877 |
| Development | | 67,355 |
| Core-hole tests | | 138,522 |
| Wells producing end of year | 18 (8-1-57) | 7 |

# MUSCAT & OMAN—DHOFAR PROVINCE

### PHYSICAL DEVELOPMENT

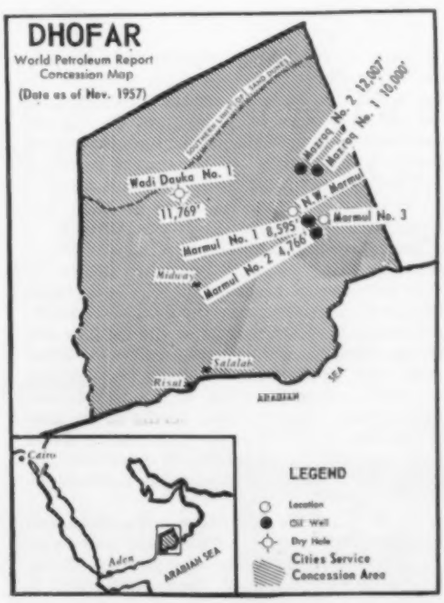
**Exploration:** In the Dhofar province of Muscat and Oman, exploration by Cities Service has resulted in four producing wells to date, and one dry hole. The first well was drilled at Wadi Dauka, indicated on the accompanying map. It went 11,767 ft.—with no shows reported. Subsequently, four more wells were drilled, as indicated on the map, and two are currently drilling. One of these, Northwest Marmul, was below 10,000 ft. at the end of 1957. Marmul No. 3 was below 6,000 ft. at the end of 1957. Marmul No. 1 and No. 2 found 80 ft. to 190 ft. of Cretaceous pay. They did not go to the bottom; there may be more pay farther down. Oil was 22 API gravity. In Mazraq No. 1, oil of about 34 API gravity (secondary) was found. The well thereafter went into salt formations. There are a number of structures in the area, which covers 32,000 square miles. One is particularly large, the Qharril structure, which lies directly east of Marmul wells. Two rigs are working at present.

The Marmul wells are currently making about 2,500 b/d. A survey has been undertaken for an offshore loading line.

In the remainder of Muscat and Oman only one more well was drilled in 1957. This was the Jebel Fahud well, located at longitude 56 deg. 30 min. east; latitude 22 north. It was drilled by Petroleum Development (Oman) Ltd., subsidiary of Iraq Petroleum. It was abandoned at 12,235 ft. in June 1957. Oil shows were encountered in many spots in this well, but permeability was very low. The company has moved off, and presumably will drill farther from the mountains, where permeability will be better.

### OIL LAWS

Operations in Dhofar are governed by an agreement made January 17, 1953, between the Sultan of Muscat and Oman, Sultan Said Bin Taimur, and Philpryor Corp. This corporation assigned all its rights to the Dhofar-Cities Service Petroleum Corp., a 100%-owned subsidiary of Cities Service Co., on September 18, 1953. Philpryor received a 2½% overriding royalty. At a later date, Dhofar Cities Service assigned 50% of its interests to the Richfield Oil Corp., with the proviso that Dhofar Cities Service would be the operator.




The concessions did not provide for any initial payments or any surface taxes. It contained the right on the part of the company to surrender the area at any time. There was an original obligation to begin drilling operations in three years—which has been long since fulfilled. There are no drilling obligations applying to exploitation. Other terms of the concession are briefly as follows: *Area*—Approximately 30,000 square miles, covering the whole of the province of Dhofar, South Arabia. *Term of Concession*—For 25 years from the date commercial production is first encountered—with option, on the part of the company, to renew for an additional 25 years. *Exploration*—The company has certain preliminary exploration obligations, with which it has already complied. *Royalty*—The Sultan shall receive a royalty of 12½% of all the oil produced and saved, until such time as all costs incurred by the company in exploration and development are recovered. Thereafter, in lieu of 12½%, the Sultan will receive 50% of the net profits accruing to the company from the operations, but in no event less than 12½% of all oil produced by the company. END

# KUWAIT

## PHYSICAL DEVELOPMENT

**Exploration:** At the beginning of 1957, Kuwait Oil Co. was engaged in exploration work in North Kuwait—following the drilling of Raudhatain No. 1, which had found oil in the Cretaceous formations. Two wells had confirmed the presence of oil in structures in northeast Kuwait. The information obtained from these wells, however, was not sufficient to determine the limits of productive area in the various formations; this was necessary in order to make detailed plans for the development of the area and to provide pipeline facilities.

Seismic surveys, undertaken in 1955 and 1956, had indicated a possible structure in northwest Kuwait, at Mutriba, approximately 30 miles to the west of Raudhatain. Since no subsurface information was available from this part of the State, it had been decided to drill a "wildcat" to investigate this structure and to provide stratigraphic control in the area.

Work carried out during the year included: (1) To determine the northern limits of the Raudhatain structure, a well, Raudhatain No. 3, was spudded in by a new British-built National 130 type rig, September 18, 1957, at a point approximately three miles north of Raudhatain No. 1. Late in October the intermediate casing was set, and drilling operations were continuing. (2) To investigate the Mutriba structure, a well was spudded on this structure, May 24, 1957. Because of lost-circulation difficulties and a protracted fishing job, progress on this well has been slow, and no significant results had been obtained by mid-November. (3) During the year, one seismic-reflection party continued with the reconnaissance coverage of the State. This party has made good progress, some advantage having been obtained from using air as the circulating medium in one of the shot-hole drills. Additionally, an under-water survey was made of Kuwait Bay by the M.V. "Sonic" in order to provide continuous reflection coverage between the two development areas in southeast and northeast Kuwait. This marine survey was carried out by GSI Ltd., under contract, and the work was completed early in October after about 210 miles of shooting had been undertaken.

**Production:** Production in Kuwait continued to rise during 1957. It dropped slightly during the early part of the year, when the Suez crisis and tanker shortage reduced production somewhat; but it then began to rise in May, and hit a peak of 1,354,400 b/d during June. Thereafter it continued at an approximate level of 1,290,000 b/d during the remainder of the year. The average for the year was 1,150,900—very silghtly above the average for 1956.

Production in this area is expected to increase rapidly in the near future. Loading facilities are being expanded and all facilities for transmission and loading capacity are being increased.

**Refining:** The expansion program for the Mina al Ahmadi refinery began during 1956, and continued through 1957. Two new distillation units, each with 80,000 b/d capacity, were added by E. B. Badger & Sons. Each includes a gasoline-stabilizing unit, and will take a distillate cut exceeding 20%, with the stress on the middle distillates which are necessary for diesel and furnace fuel oils, as well as for providing bunker and diesel fuel for tankers.

**Transportation:** Kuwait Oil Co. plans a 70-mile 30-in. crude pipeline in 1959, from North Kuwait to the Ahmadi North tank farm. The company is completing a 6-mile 32-in. gravity line from South Ahmadi tank farm to the South Pier at Mina al Ahmadi terminal, as well as three miles of 20-in. from the Burgan gathering system to the main line. Scheduled for 1958 completion are 16½ miles of 38-in. and 40-in. from North Ahmadi tank farm to the North Pier, and 12½ miles of 32-in. and 34-in. from Burgan field to North Ahmadi.

Tanker loading facilities at Mina al Ahmadi have recently gradually approached saturation with increase in production. KOC has made arrangements to increase the available facilities of eight loading berths at the oil pier and five sea berths—each of these sea berths being fitted with two submarine lines. Two further sea berths will be installed, each with two submarine lines—one of these berths to be used for loading export fuel oil and marine diesel oil produced in the new refinery extension; the other to be used as a crude-loading and bunker-fuel berth.

The first of the new submarine lines was launched, May 11. This 24-in. line had to be carried out into the water on a gradual 25-deg bend to a gap in a reef. From that point, it was carried out straight to the berthing point. Previously, all submarine lines had been hauled straight off the shore to the berthing station. When 24-in. lines are being launched at Mina al Ahmadi, in order to reduce the buoyancy a 12-in. line is threaded through and then recovered and pulled out as a bunker line to the same berth. To speed these new loading lines, a new 32-in. gravity line is being laid to connect the tank farm at Ahmadi with the oil-loading berth.

Kuwait Oil Co. Ltd. is to build a new oil jetty, some four miles north of the present jetty, which initially will accommodate three tankers of largest projected size simultaneously. Depth of water at low tide is 55 ft. to 60 ft.; loading rate per tanker is envisaged as 5,000 to 6,750 tons per hour. Jetty will be completed in two years at a cost of £8 million.

**Marketing:** In spite of the Suez shutdown, crude exports from Kuwait and Kuwait Neutral Zone were 2% higher in 1956, for a total of 401,776,659 bbl. During 1957 exports,

### REFINERIES IN KUWAIT—1957

| *Name of Company* | *Plant Location* | *Crude Capacity* | *Type Plant* | *Cracking Capacity* |
|---|---|---|---|---|
| Kuwait Oil Co. Ltd. | Mina al Ahmadi, Persian Gulf [1] | 30,000 | S | — |

[1] Under construction: Crude capacity to be increased by erection of two 80,000 b/d crude units, complete early 1958.

Capacities are in barrels per day. Key to type of plant: S—skimming; L—lubricating; A—asphalt; C—cracking; Comp.—complete. Under cracking capacity to indicate type: T—thermal; C—catalytic. All data as of December 1, 1957.

### KUWAIT—REFINERY OUTPUT* (Tons)

| | 1956 |
|---|---|
| Crude capacity | 1,400,000 (30,000 b/d) |
| **Product output** | |
| Gasoline | 47,000 |
| Kerosine | 19,000 |
| Gas-diesel oils | 270,000 |
| Fuel oil | 860,000 |
| Bitumen | 13,000 |
| Other products | 191,000 |
| Total | 1,400,000 |

*All from Kuwait Oil Co.'s Mina al Ahmadi refinery. Expansion, begun in 1956, to 8.5 million tons per year from 1.4 million tons (to 190,000 b/d from 30,000 b/d) is expected to be complete in 1958.

### Oil Law Summary★

*There is no oil law. Following is a summary of concession contract over entire country between Kuwait Oil Co. and govt.*

**Duration:** Until December 22, 2026. **Area:** Entire area of Kuwait, not including Neutral Zone and islands of Kulor, Qaru, Umm al Maradim, or territorial waters of same. **Dead Rent:** $28,500 until exports. After exports, replaced by min. US $83,250 royalty. **Royalty:** 3 rupees per ton. Tax-commutation payment of ¼ rupee per ton. **Income Tax:** Adjusted to give govt. 50% company income before deduction of foreign taxes. Deductions include cost of production, exploration, drilling and development costs, depreciation, depletion, and obsolescence. **Minimum Payment:** Reportedly minimum payment 5,000,000 pounds sterling if production ceases. All payments to govt. made in sterling. **Export Valuation:** Because company set up as nonprofit organization, where each of the owner companies (Gulf and British Petroleum) pays Kuwait Oil Co. cost of production, plus one shilling per ton produced, system of calculation of export cost of crude set up similar to Iraq. Govt. receives 50% share based on full posted prices minus discount of total of 7%. Discount consists of 8½% discount on production between 20 and 50 million tons yearly, to maximum of 5% discount on entire production. To this is added 2% discount given for a type of brokerage allowance, for total of 7%. **Marketing Contracts:** Marketing pattern for Kuwait crude subject to long-term purchase contracts. One with Shell group covers 1.25 billion barrels of crude over 22 yrs. Profit-sharing arrangement adds Shell's cost of marketing, transporting and refining oil to Gulf Oil Co.'s production cost; subtracts total from amount received from sale, and divides result 50-50. Second set of contracts by Socony Mobil and Standard Oil Co. (N. J.) with British Petroleum covers 1.3 billion barrels of crude over 20-yr. period. Standard to receive 800 million and Socony 500 million barrels. Contract effective June 1, 1952. Price on "cost-plus" basis. To cost of production is added a fixed profit per unit. All 3 contract buyers subject to taxation on difference between their purchase price and the posted price, minus discounts permitted.

★Taken from *World Petroleum Legislation*, 604 Fifth Ave., N. Y. 20, N. Y. (see p's 37-38)

as shown in the accompanying tables, reached a new high.

### NATIONAL FACTORS

Income of the government of Kuwait from oil is already at the highest per-capita level in the world, and rising rapidly. During 1956, oil revenues are estimated at about 100 million pounds sterling ($280 million), of which the government spent 50 to 60 million pounds on new development works, maintenance and services—about 40% more than was spent in the previous year. New projects include a 6.5 million pound project for the improvement of Kuwait Port by dredging and pier construction. Also on the list are a road to Basra, a new Subah hospital, a civic building, and a new telephone exchange. The government is giving generous compensation to owners of houses or plots which are required to make way for new streets and public buildings.

**KUWAIT—DOMESTIC CONSUMPTION* OF OIL PRODUCTS (Barrels)**

| | 1956 |
|---|---|
| Gasoline | 514,000 |
| Kerosine | 143,000 |
| Gas-diesel oils | 100,000 |
| Bitumen | 71,000** |
| Total sales major products | 750,000 |

*Exclusive of Kuwait Oil Co. consumption.
**Estimate; probably more.

**KUWAIT—DISTILLATE EXPORTS**
(US Barrels)

| To: | 1957 1st 7 Months |
|---|---|
| West Indies | 456,403 |
| Netherlands | 146,105 |
| Australia | 73,068 |
| United Kingdom | 67,874 |
| Total | 743,450 |

Income per capita is now about 500 pounds per year, equivalent to about $1,400 yearly, and local commerce is increasing rapidly. There is presently about one motor vehicle for every 10 persons. Imports of new automobiles during 1956 where 7,000. Consumption within the country of petroleum products has continued to rise, and a considerable number of Kuwaitis have acquired the necessary commercial experience and capital to form local construction companies. These are employed, so far as possible, by Kuwait Oil Co. in its works.

Kuwait Oil Co. plans to increase production by about 25% by the end of 1958. This would raise Kuwait's production to about 1,800,000 b/d at the end of the year. Principal factor holding back expanded production is completion of two more oil-gathering systems. These, No. 12 and 13—with a capacity of 140,000 b/d each—will raise income of the government proportionately.

Discussions with Iraq by the Kuwait government during 1957 concerned offshore limits of Kuwait's territorial waters. These have not been yet defined, and their lack of definition has held up granting oil rights over them.

A pipeline outlet to Mina al Ahmadi from southern Iraq reportedly has been tentatively approved by the Kuwait government. This line, proposed by Iraq Petroleum Co., would link the Zubair fields of southern Iraq with the only port in that area on the Persian Gulf accessible to giant tankers.

The general economic expansion in Kuwait was furthered by the development of the program which in 1956 began to come to life after about two years of indecision. Development projects completed include a new brick factory, State concrete factory, 12 new schools, and 1,500 low-income housing units during 1956. During 1957, work was begun on the expansion of water-distillation plant capacity, port dredging, and pier construction previously mentioned, as well as a new municipal building, new justice building, and a hotel. During 1958, a new power-generating station, known as Station "B," will be completed. It will further a program of rural electrification.

**KUWAIT—CRUDE-OIL EXPORTS, BY COUNTRY OF DESTINATION**
(Thousands of US Barrels)

| | 1957 1st 7 Months | 1956 1st 8 Months |
|---|---|---|
| United Kingdom | 81,369 | 92,158 |
| United States | 29,370 | 36,385 |
| France | 24,028 | 28,586 |
| Netherlands | 22,905 | 25,077 |
| Japan | 11,945 | 13,397 |
| Italy | 10,147 | 14,519 |
| Australia | 8,140 | 9,400 |
| Argentina | 6,752 | 7,871 |
| Aden | 4,899 | 7,582 |
| Brazil | 4,611 | 5,509 |
| India | 3,347 | 3,933 |
| Belgium | 3,088 | 3,088 |
| UK-Continent | 1,246 | 1,246 |
| Canada | 545 | 545 |
| Sweden | 504 | 504 |
| Other countries | 6,957 | 9,047 |
| Total | 219,855 | |

During 1957, new flash-type evaporator units for production of 500,000 gal. of water daily from sea water were completed by Chicago Bridge & Iron Co. Thirteen more distillation plant units, each with a capacity of one million gallons, have been suspended in favor of a plan to pipe water from Shatt al-Arab, in Iraq.
END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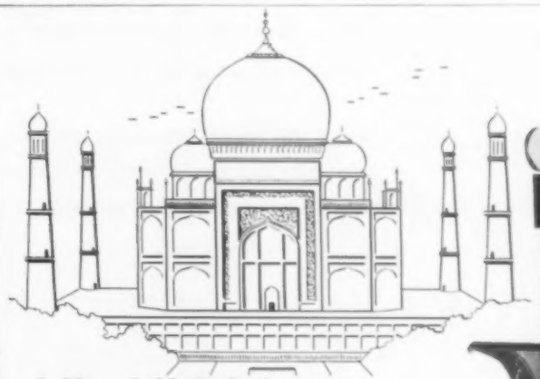
**1957**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# IRAN

## PHYSICAL DEVELOPMENT

**Exploration:** Principal exploratory development in Iran, aside from the new oil law, was the signature of the SIRIP concession and the opening of additional areas of Iran to concession.

SIRIP is, as covered later herein under discussion of its concession, jointly owned by AGIP Mineraria (owned, in turn, by the Italian government through ENI), and National Iranian Oil Co. (NIOC). Its concession was widely publicized as an upset of the traditional 50-50 profit-sharing arrangement in the Middle East and other parts of the world, but it actually was not. Toward the end of 1957, ENI indicated it would welcome participation and a farmout to an established American company in development of the SIRIP areas. Nothing in the concession would prevent this, but there have been no takers so far.

Reports also circulated, during December 1957, that rights had been granted to other oil companies in Iran—including a Japanese, German, and American concern. These reports were not correct, however, and no other concessions were granted during the year.

The consortium resumed active exploration in 1956—with a survey party in the area between Bandar Lingeh and Bandar Abbas. Studies were made of the anticlines near Bandar Lingen and the large Kuh-i-Bandi-Lingeh rock formation. Two seismic parties worked north of Bushire near Ganaweh and, at the beginning of 1957, were on structures at Bibi Hakimeh and Kuh-i-Binak. In the second quarter of 1957 six crew-months were put in, using two lease crews from Geophysical Surveys Inc.

A wildcat is to be drilled in the Kuh-i-Binak structure, which is on the Persian Gulf close to the offshore block belonging to SIRIP. It is the first wildcat on the coast of Iran in 25 years. The last one was a noncommercial producer in 1932, at Kuh-i-Mund, south of Gach Saran, abandoned at 3,837 ft. It found shows of very heavy 5 API gravity oil, in the Eocene and Cretaceous, which would not flow.

During late 1957, the government divided Iran into some 20 to 25 petroleum "zones," and announced that about two-thirds would be opened to bids. The Qum area is reserved to government development only. District I, which includes all offshore territorial waters of Iran (excluding the consortium area which extends three miles offshore, with the islands of Shaikh Shuaib, Kharg, and Khargo and the 3-mile territorial waters surrounding them, plus the offshore rights granted to SIRIP) was declared open for bids. Companies were given to February 1, 1958, to apply for a questionnaire establishing financial and technical competence. They could then obtain from NIOC a copy of the specifications booklet and specimen agreement. No proposals after March 31, 1958, would be accepted. All proposals would be examined within two months, and announcement made thereafter. There is no priority on applications.

On December 2, 1957, Districts III and IV were opened (location of District II is not known). Districts III and IV extend offshore, and were described as follows:

*District IV*—"of the petroleum districts of Iran, including part of the Iranian continental shelf and territorial waters (in Gulf of Oman) and also part of the mainland situated on the south of the orbit of latitude 27°, 0′ north, between the meridian of longitude of 59°, 25′ east of Greenwich and the Iran-Pakistan border, together with the islands therein, shall be declared as 'Open' with effect from 1st March 1958."

*District III*—"of the petroleum districts of Iran, including part of the Iranian continental shelf and territorial waters (in Gulf of Oman) and also part of the mainland situated on the south of the orbit of latitude of 27°, 0′ north, between the meridians of longitude of 57°, 5,24″ and longitude of 59°, 25′ east of Greenwich together with the islands therein, with the exceptions described below, shall be declared as 'Open' with effect from 1st March 1958.

"A. Part of the mainland situated between the orbits of latitude of 27°, 0′ and latitude of 26°, 20′ north, and the meridians of longitude of 57°, 5, 24″ and longitude of 57°, 20′ east of Greenwich shall not be included in the above-mentioned district.

"For the whole area situated within the boundaries described below:

"From point (a) at longitude of 57°, 50′, latitude of 25°, 48′, thence on a straight line to:

"Point (b) at longitude of 59°, 25′ latitude of 25°, 48′, thence on a straight line to:

"Point (c) where the meridian of longitude of 59°, 25′ intersects a 'ten fathom, constant depth,' line at approximate latitude of 25°, 23′, thence on a line coincidental with the same 'ten fathom, constant depth,' line to:

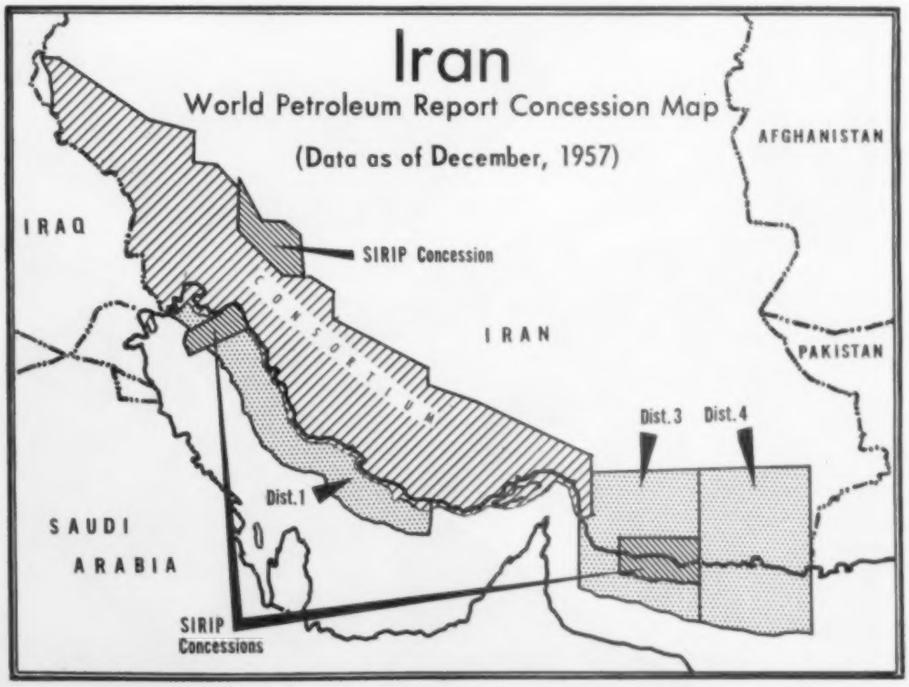
"Point (d) where the 'ten fathom, constant depth,' line intersects the meridian of longitude of 57°, 50′ at approximate latitude of 25°, 36′, thence on a straight line to point (a) mentioned above. Although considered as part of the said district, no proposals shall be accepted since it has previously been committed."

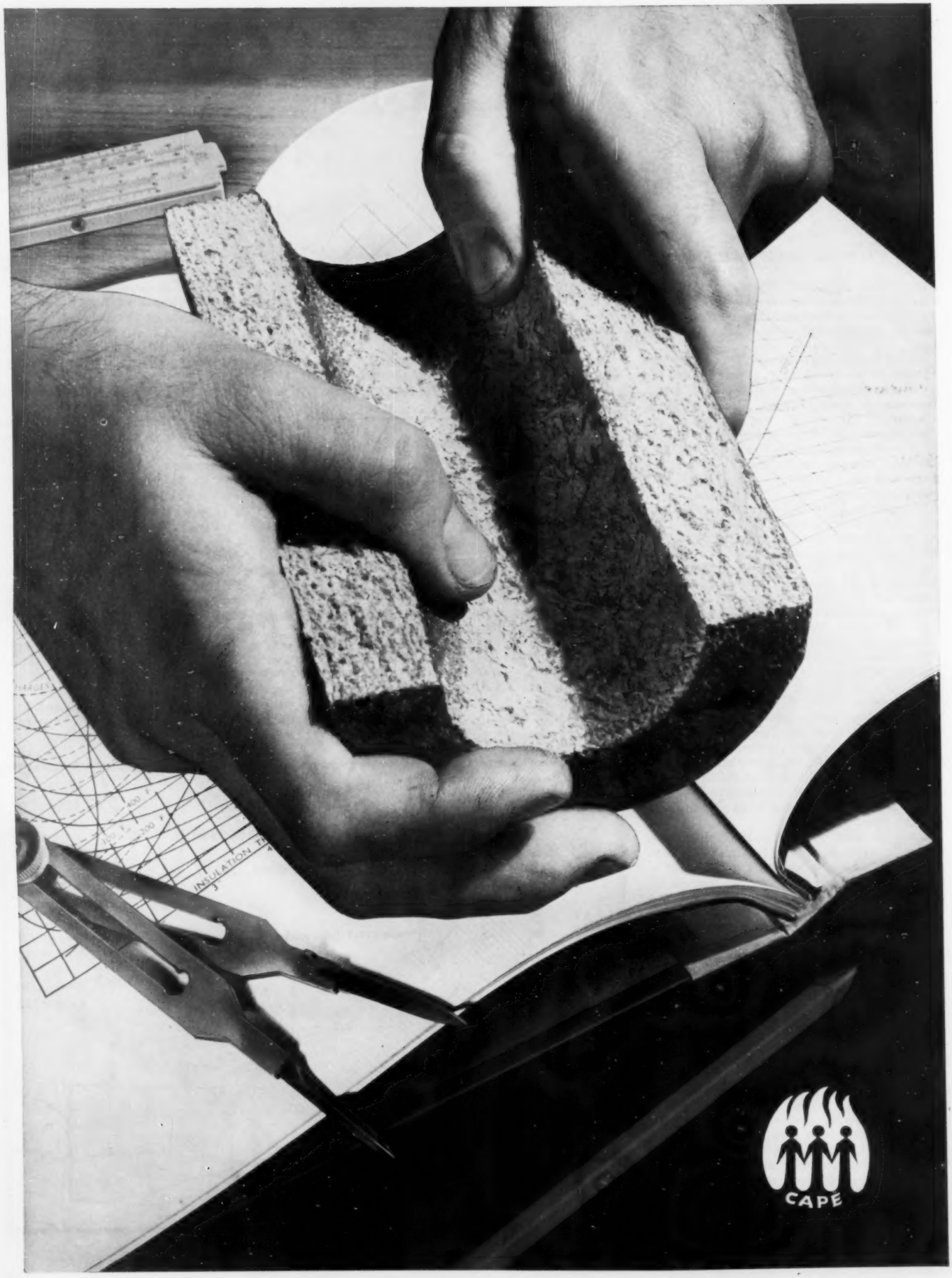
**IRAN—OIL OPERATIONS**

(Barrels Per Day)

| | 1957 1st 10 Months | 1956 Year | 1955 Year |
|---|---|---|---|
| Crude production | 714,325 | 534,000 | 326,000 |
| Abadan refinery throughput | 319,712 | 232,000 | 152,000 |
| Crude exports | 303,000* | 289,000 | 169,000 |
| Products to NIOC | 39,000* | 33,000 | 31,000 |

*First four months 1957.

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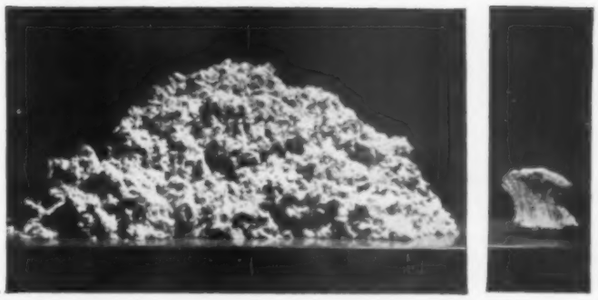

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EFFICIENCY DATA SHEET—PIPE SIZES 6" to 10" BORE.

| HOT FACE TEMPERATURE °F. | | | 400°F | | | 600°F | | | 800°F | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| THERMAL CONDUCTIVITY K = B.Th.U. in./sq. ft. hr./in./°F. | | | 0.43 | | | 0.47 | | | 0.53 | | |
| MEAN TEMPERATURE °F. | | | 250 | | | 350 | | | 450 | | |
| Nominal Pipe Size | O.D. Pipe | Thickness of Insulation | Heat Loss B.Th.U. sq. ft. hr. | Effic. % | Surface Temp. °F. | Heat Loss B.Th.U. sq. ft. hr. | Effic. % | Surface Temp. °F. | Heat Loss B.Th.U. sq. ft. hr. | Effic. % | Surface Temp. °F. |
| 6" | 6⅝" | 1" | 135 | 87·7 | 126 | 233 | 90·6 | 167 | 354 | 92·5 | 218 |
| | | 1½" | 102 | 90·8 | 107 | 177 | 92·9 | 135 | 270 | 94·3 | 171 |
| | | 2" | 83·6 | 92·4 | 97 | 145 | 94·1 | 118 | 223 | 95·3 | 145 |
| | | 2½" | 71·8 | 93·5 | 91 | 125 | 95·0 | 107 | 192 | 96·0 | 128 |
| | | 3" | 63·5 | 94·2 | 86 | 110 | 95·5 | 100 | 170 | 96·4 | 117 |
| | | 3½" | 57·3 | 94·8 | 83 | 100 | 96·0 | 95 | 154 | 96·7 | 109 |
| | | 4" | 52·6 | 95·2 | 81 | 91·7 | 96·3 | 91 | 142 | 97·0 | 103 |
| 8" | 8⅝" | 1" | 130 | 88·0 | 127 | 225 | 90·8 | 169 | 341 | 92·7 | 222 |
| | | 1½" | 97·7 | 91·0 | 108 | 169 | 93·1 | 137 | 258 | 94·5 | 174 |
| | | 2" | 79·2 | 92·7 | 98 | 138 | 94·4 | 120 | 211 | 95·5 | 148 |
| | | 2½" | 67·4 | 93·8 | 92 | 117 | 95·2 | 109 | 180 | 96·1 | 131 |
| | | 3" | 59·2 | 94·6 | 87 | 103 | 95·8 | 102 | 159 | 96·6 | 120 |
| | | 3½" | 53·2 | 95·1 | 84 | 92·7 | 96·2 | 96 | 143 | 96·9 | 111 |
| | | 4" | 48·5 | 95·6 | 82 | 84·6 | 96·5 | 92 | 131 | 97·2 | 105 |

*These figures are compiled from results of official tests by THE NATIONAL PHYSICAL LABORATORY, TEDDINGTON, computed in accordance with formulae shown in BRITISH STANDARD SPECIFICATION appendices.*

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Applications are received up to March 1, 1958, at offices of NIOC, 179 France Avenue, Teheran, for questionnaires. Thereafter proposals can be submitted up to (not including) May 1, 1958.

**IRAN—PRODUCTION AND DRILLING DATA**

| Name of Field | Year Discovered | Depth (Feet) | API Gravity | Production (Barrels Per Day) 1957‡ (1st Half) | 1956 |
|---|---|---|---|---|---|
| Agha Jari | 1936 | 4,900-9,800 | 34.8 | 430,000 | 403,444 |
| Gach Saran | 1928 | 2,800-6,150 | 31.8 | 43,000 | 231 |
| Haft Kel | 1928 | 1,900-4,000 | 38.3 | 123,000 | 96,988 |
| Lali | 1938 | 4,000-9,000 | 37.2 | 9,500 | 7,134 |
| Masjid-i-Sulaiman | 1908 | 640-3,600 | 36.7 | 42,000 | 44,017 |
| Naft Safid | 1935 | 3,000-6,000 | 35.2 | 37,500 | 20,815 |
| Naft-i-Shah | 1923* | 5,000 | 35.0 | | **3,400 |
| Alborz (Qum)† | 1956 | 7,800 | NA | NA | NA |
| Average, b/d | | | | 685,000 | 576,029 |

*NIOC-operated. **Estimated. †NIOC wildcast blew in Aug. '56; estimated flowing 80,000 b/d. ‡Average 1st 7 months '57, 696,000 b/d.
NA—Not available.

The basis of the bids is to be specified in a specimen agreement as supplied by the government to interested bidders. It does not differ from the new oil law in any major way, and provides for cash bonus and specification of the amount of NIOC participation to be accepted. The oil law provides operators may pay a bonus in lieu of government participation, and it is this route which most of the larger oil companies will prefer to take. Rentals on successful bids are to be fixed on basis of the area's location and oil favorability. A portion of both bonuses and rentals will be payable, on signature, in a lump sum—both being tax-deductible. Instead of rentals, a company may assume NIOC's share of exploratory cost up to discovery of commercial production. In this case, the foreign partner would be subject to a minimum exploratory investment, set by NIOC.

Among the companies known to be interested in offshore acreage is Standard Oil Co. (New Jersey), which is specifically interested in paying a large bonus rather than accepting NIOC participation. Persistent press reports have appeared concerning two Japanese companies conducting negotiations. One of the companies has been identified as Idemitsu Kosan Kaisha; the other is the Japan Petroleum Resources Development Co.

**Production:** 1957 production was 634,225 b/d (partly estimated), up 18.4% over 1956. Iran was the only Middle East country not affected adversely by the Suez crisis—in fact, it enabled her to regain markets lost during the nationalization period. In July production broke the former all-time record of 722,000 b/d, when it rose to 756,000 b/d. By September, it was up to 766,000 b/d. The output was comfortably above the minimum specified in the consortium agreement for 1957 (27½ million cubic meters).

Part of the increased production during the Suez period was due to extra market gained from Saudi Arabia's four-month ban on oil shipments to Bahrain Island. Another was the call for extra crude to Abadan, which normally takes some Kuwait crude.

Payments to the government totaled 54,822,814 pounds sterling during 1956 (US $152.1 million)—not including 15,000,718 (US $42 million) brought in by operating companies to meet expenses in the country. Total revenues since consortium began (at the end of 1954) through 1956 were 89,312,791 pounds sterling (US $250 million).

Production came from a total of 91 flowing wells, of which only 65 were actually allowed to produce (as of mid-1957).

**IRAN—CRUDE PRODUCTION BY FIELDS**
(1st 8 months, barrels)

| | 1957 |
|---|---|
| Agha Jari | 108,529 |
| Gach Saran | 11,107 |
| Naft Safid | 9,856 |
| Haft Kel | 29,953 |
| Masjid-i-Sul | 10,337 |
| Lali | 2,211 |

The Agha Jari field, biggest of the six southern fields operated by the consortium, has been extended six miles to the northwest by a potential producer of around 20,000 b/d. No. 30 Agha Jari exploratory well entered the Azmari limestone at the expected depth of 6,400 ft. The consortium plans to increase the field's potential producing capacity to 600,000 b/d by extra wells and new facilities.

During November 1957, it was announced by the consortium that projected expenditure of £50,000,000 (US $140 million) by the Iranian oil operating companies in their agreement area of South Iran had been approved over the next 2½ years. Of this total, £19,000,000 ($53 million) is earmarked for development of facilities to handle increased production from the Gach Saran oil field.

The budget also provides for a substantial increase in the output of the Agha Jari oil field and the construction of a new pipeline to the present crude-oil loading terminal at Bandar Mashur, where new jetties are being built.

Both exploration and drilling will be stepped up. Additional geological, geophysical, and survey parties will work throughout the agreement area, and the number of rigs will be increased to nine.

Housing and welfare programs will absorb altogether £10,000,000 ($28 million). 1,320 new houses for employees of the companies are planned. New medical facilities costing approximately £1,000,000 will be provided, at the joint expense of the operating companies and of the National Iranian Oil Co.

The government has gone ahead with plans to develop its 1956 discovery at Qum. The Shah announced $17 million had been set aside for development there, which squelched rumors that a concession over the area might be given to a foreign company. An outpost well, Alborg No. 6, came in, September 5, at 8,754 ft. Further drilling is in progress; and IOC, a subsidiary of NIOC, plans to drill Alborz No. 7. According to press reports from Teheran, NIOC has a two-year plan whereby about one well every 6 months will be drilled—completing about 6 in 2½ years. Production will be about 40,000 b/d, according to NIOC—all consumed in Iran and refined locally. A pipeline, to be laid when reserves are finally determined, will permit export, according to NIOC.

**Transportation:** During 1956, only minor pipelines were constructed, but plans were made for the construction of a 26- to 28-in. pipeline from the Gach Saran field to the Persian Gulf, and a 16- to 20-in. line from Agha Jari to Bandar Mashur.

Crude oil is at present exported through the loading terminal at Bandar Mashur, where four jetties are in operation. Work was completed during 1957 on two new jetties and begun on 18 new tanks and four new loading systems. Crude-oil storage was increased to 460,000 tons, and the tanker loading rate raised to 3,000 tons per hour at each jetty. A central control room, with remote-control instruments for all loading operations, is being considered for Bandar Mashur.

The 300-mile Ahwaz-Azna section of Abadan-to-Teheran 10-in. products pipeline was completed and in operation four months ahead of schedule. Storage facilities were added at Shar Rai, near Teheran.

A major pipeline was proposed by NIOC, and tentative arrangements for its financing were made with Allen and Co., an investment house in New York. The line would be costly, about $250 to $500 million, and major reserves must first be proved at Qum. Probably the building of the line would have to be tied to something other than its transportation revenue, such as a concession arrangement.

A $5 million 146-mile 6-in. 6,000-b/d line is to be built during 1958 from Asna to Isfahan, according to press reports.

Because the Bandar Mashur loading port is limited in size, a line may be built by the consortium to Kharg Island, about 20 miles from the coast, or at Ganaweh, 50 miles north of Bushire. Cost of this would be high, but it would afford facilities for the larger tankers which Bandar Mashur cannot now supply for over 40,000 dwt:

## Oil Law Summary★

*1957 Law authorizes NIOC (National Iranian Oil Co.) to conclude contracts with private companies for oil development outside consortium area, following approval by Council of Ministers. Such contracts grantable only to companies or persons whose home country provides similar privileges to Iranians.*

**EXPLORATION - EXPLOITATION:** Combined in one contract. **Area:** 25,000 sq. km. where NIOC HOLDS 50% interest or more. 20,000 sq. km. wherein NIOC holds less than 50% interest. **Duration:** 25 yrs. max. from date commercial production. Three extensions of 5 yrs. grantable on request. Last two extensions subject to laws in effect at time of extension. If NIOC has less than 50%, 20% area held must be returned on 1st extension. **Drilling Obligation:** First well within 4 yrs. If production not obtained in 12 yrs., contract is dissolved. Where NIOC owns less than 50%, one well within first 5 yrs. and thereafter one well each year. Contract cancelled if production not obtained in 12 yrs. **Area Return:** Where NIOC owns 50% or more of operating company, ½ total area must be returned within 10 yrs. to NIOC. Where NIOC owns less than 50%, ½ area must be returned within 5 yrs. following commercial production, with max. 2,000 sq. km. retained. At end of 12th yr. any company, no matter what its ownership, shall have retained only producing areas. **Bonus:** Initial bonus and surface rental payable, depending upon and compatible with, area covered. Private company may agree to meet all exploration expense in lieu of bonus and annual surface tax. This includes both its share and the share of the NIOC. **Import Duties:** Exemption given on materials for operations. **Income Tax:** Operators exempt from all taxes except payments to NIOC and income tax. Income tax Act of 1956 applies. These are not less favorable than those in Art. 35 Income Tax Act of 1949, as contained in Art. 36 of 1956 Income Tax Act. Payments in dollars or sterling as specified by NIOC. **Exports:** Proceeds from exports may be retained by operator. Payments to NIOC made in Iranian currency. **Internal Consumption Requirements:** Must be furnished to NIOC by operator at cost, plus reasonable "operating" fee. **National Reserves:** NIOC will set aside 1/3 total sedimentary basins of Iran as National Reserves, excluded from operation of petroleum law.

★Taken from *World Petroleum Legislation*, 604 Fifth Ave., N. Y. 20, N. Y. (see p's 37-38)

**Refining:** The only major refinery in Iran, and the world's largest, is at Abadan. Facilities there include:

*Distillation:* Atmospheric, 5 units; vacuum, 6 units; steam (residue), 3 units; reforming, 5 thermal units; catalytic cracking, 1 unit; $SO_2$ extraction; kerosine, 4 units; benzine (95% extraction), 1 unit; alkylation and isomerization, 2 alkylation units, 3 isomerization units; superfractionating, 8 units; lubricating-oil plant; bitumen plant; sulfur-recovery plant.

In addition to the above, there are the requisite ancillary redistillation, refining, acid, and refinery chemical manufacturing units, besides the fundamental power and engineering plants.

**Marketing:** Total exports from Iran have continued to rise with increased production. The consortium oil companies had direct crude-oil exports in September 1957 of 12,055,872. Companies delivered another 355,271 bbl. of crude to the National Iranian Oil Co. for export, while another 9,079,401 bbl. was delivered to the refinery at Abadan—a total of 21,490,544. In the first nine months of 1957 the total of exports, crude to NIOC, and crude to Abadan was 181,426,814 bbl. Under the consortium agreement, consortium members agree to produce 35 million cubic meters of crude in the three categories—exports, delivery to NIOC, and deliveries to Abadan. The cumulative nine-month figure of 181.4 million is 28,844,732 cubic meters.

**REFINERIES IN IRAN—1957**

| *Name of Company* | *Plant Location* | *Crude Capacity* | *Type Plant* | *Cracking Capacity* |
|---|---|---|---|---|
| Iranian Oil Refining Co. | Abadan [1] | 460,000 | Comp. | 102,000TC |
| National Iranian Oil Co. | Kerminshah | 3,000 | S | — |
| | Total | 463,000 | | 102,000TC |

[1] 75,000 b/d thermal reforming capacity, 27,000 b/d catalytic cracking capacity.

Capacities are in barrels per day. Key to type of plant: S—skimming; A—asphalt; Comp.—complete. Under cracking capacity to indicate type: T—thermal; C—catalytic. All data as of December 1, 1957.

## NATIONAL FACTORS

Since most of the obligations to which oil operations are subject are contained in the oil law, the principal determinant of investment favorability is the government's attitude. The agitation for expropriation which was aroused by the nationalization of Anglo Iranian Oil Co. has died down, and at present even the Teheran papers are rarely critical of the consortium. Partly this is due to the Qum discovery, which served to divert public attention, and partly to the benefits from oil development which have been more visible in recent years.

The government has set up a wide and inclusive "Plan Law" for development. The plan organization will receive 60% of Iran's total oil revenue during the period March 21, 1955 to March 20, 1958, and thereafter, until the expiration of the second seven-year period of its activity in September 1962, will receive 80%. The law calls for an expenditure of rials 52.8 billion from all sources, plus a carryover of rials 17.2 billion from the first Seven-Year Plan—in all, rials 70 billion, or $932,000,000.

Expenditure of the new rials 52.8 billion divides under the law, in chapters, as follows:

| | | Millions of Rials |
|---|---|---|
| Chap. I | Agriculture and Irrigation | 11,958 |
| Chap. II | Communications | 17,454 |
| Chap. III | Industries & Mines | 7,801 |
| Chap. IV | Public Services | 15,587 |
| | Total | 52,800 |

**IRAN—PAYMENTS TO IRANIAN GOVERNMENT AND NIOC**

| | Crude Production (Barrels) | Payments* |
|---|---|---|
| 1957 (estimated) | 231,492,200 | $148,000,000 |
| 1956 | 195,580,000** | 146,220,734 |
| 1955 | 119,002,000** | 88,071,849 |

*Payments include income taxes, cash, payments in kind, and stated payments. In 1956 income-tax payments were $103,368,616: cash $36,753,920; oil in kind $6,098,198; stated payments $42,852,118.

**These are production figures by AAPG.

During 1957, the par value of the Iranian rial was changed from 32.25 rials to 75.75 rials per US dollar. END


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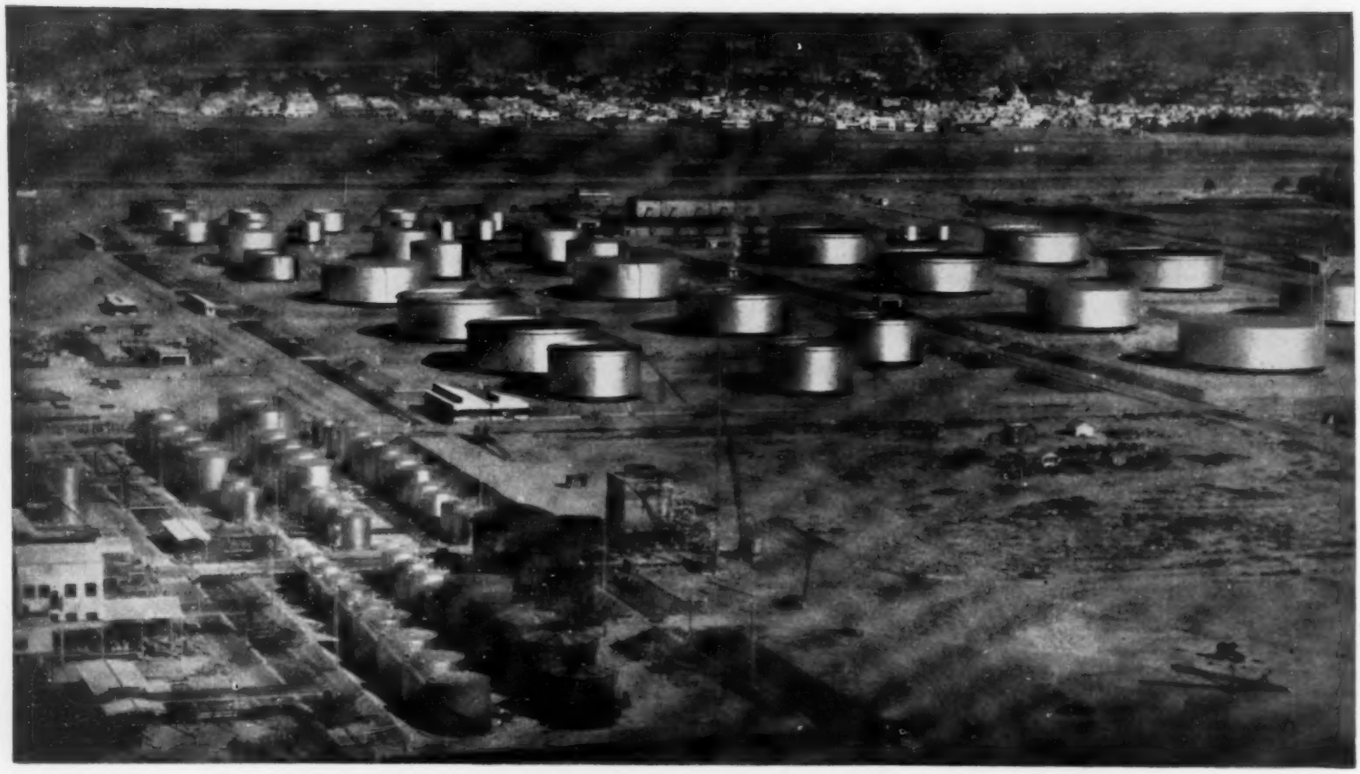

*The Iraq Government Refinery at Daura, Baghdad. We supplied the majority of the tanks and erected all of them, including the lubricating oil plant tanks shown in left foreground. The total number of tanks supplied was 120 and tank steel 7847 tons.*

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# IRAQ

## PHYSICAL DEVELOPMENT

**Exploration:** *Iraq Petroleum Co. Ltd.*—At the beginning of 1957, a four-string program was in operation; but in April, and until the end of November, two rigs were in use with an occasional third.

Drilling was continued at Bai Hassan and Jambur. In March, Pulkhana 5 was completed as an observation well at 5,130 ft. Injanah 5 was spudded in during March; it had reached 10,422 ft. at the end of November. Total footage for the year was probably around 21,900 ft. (Estimated completions: six wells, of which three are producers.)

Pumping of Kirkuk crude to the Mediterranean was resumed at a rate of 10.5 thousand tons per year (about 210,000 b/d) on March 11, 1957. By November, the average rate for the month was 16.1 thousand tons per year, and the production rate from Kirkuk had reached 350,000 b/d.

Total production to the end of November was 10,203,713 tons, and the total for the year was approximately 11.5 million tons (230,000 b/d).

*Basrah Petroleum Co. Ltd.*—A two-string drilling program was maintained from January to November, 1957. Rachi No. 1 was completed and abandoned at 12,959 ft. in April. Suhain No. 1 was spudded in, October 22, and had reached 4,060 ft. by the end of November. Total footage for the year will be approximately 61,200 ft. (Estimated completions: six wells, of which four are producers.)

Total production to the end of November was 8,114,484 tons, and the total for the year will be approximately 9 million tons (180,000 b/d).

On January 19, 1957, BPC exported its 25-millionth ton of crude from Fao terminal.

*Mosul Petroleum Co. Ltd.*—Tharthar No. 1 was abandoned at 12,610 ft. in August. In February, Gullar No. 1 was abandoned at 10,148 ft. after tests had proved negative. Ibrahim No. 1 had reached 10,776 ft., and was about to be abandoned in November. Falluja No. 1 was spudded in on August 24, at the end of November its depth was 7,994 ft. Two wells were drilling at Butmah in November. Total footage for the year will be approximately 24,200 ft. (Estimated completions: four wells, of which one is a producer.)

Production from Ain Zalah and Butmah had virtually stopped for the first two months of 1957. Production for March was 24,300 tons, after the resumption of pumping to the Mediterranean. Total production to the end of November was 482,590 tons, and the total for the year was approximately 550,000 tons (110,000 b/d).

**Transportation:** The principal pipeline system of Iraq consists of the 12-in., 16-in., and 26- to 32-in. pipelines from Kirkuk field to Banias, Syria. Plans for supplementing these lines have been postponed by the company due to sabotage at Syria; however, additional outlets for Iraq's production now are badly needed. It was announced during 1957 that BPC will build a substantial offshore loading terminal about 27 miles from Fao port on the Persian Gulf at Khor Abdullah. A center island will be built—with the wing at each end capable of loading one supertanker. The wings can be extended, if needed. Work on the project is expected to be completed by mid-1960. 38-in. submarine loading lines would permit 180,000 b/d of BPC oil to be loaded there. By the end of 1959, IPC plans are to increase pipeline capacity by about 30% from northern Iraq fields to the eastern Mediterranean. The company also has purchased five drilling rigs; it plans to increase production, according to press reports, by expanding drilling activities in northern Iraq.

During 1957, a pipeline from Iraq and Kuwait, through Turkey, to Iskenderun was contemplated. The line, which would be the largest in the world, was to be sponsored by a consortorium of oil companies in the Middle East. There has been little heard of this pipeline in recent months, and it is now considered as abandoned. There was considerable opposition by Iraq to the line, since Iraq had maintained that pipelines should travel an all-Arab route, and considerations of flexibility through increased use of tankers prevailed.

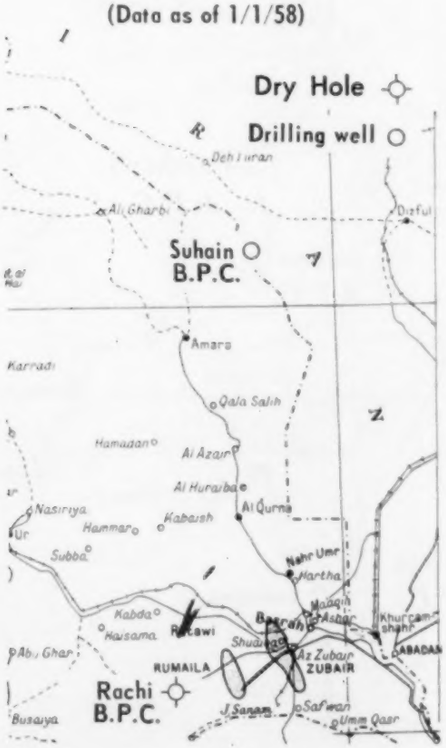
**Refining:** During 1957, it was announced that the Government Oil Refineries Administration, in Iraq, had authorized Foster Wheeler Ltd. to design and construct process facilities at the Daura (Baghdad) refinery for: (1) expansion and modification of existing combination unit, which will increase its capacity to 48,000 b/d from 24,000 b/d; (2) a 5,000 b/d Powerforming unit; (3) a kerosine treating unit—5,000 b/d; (4) substantial offsite facilities. Foster Wheeler recently completed for the Iraq government a complete lubricating-oil manufacturing plant.

A 500 b/d lube plant was completed at Daura refinery for the government during 1957. The government considers the plant the first step in building a petrochemical industry, which will include a sulfur-recovery unit using natural gas, gas pipelines from Kirkuk to Baghdad, and a plastics industry. The cost of the lube plant is about $11.6 million.

**Marketing:** Plans are under way to raise Iraq's oil export capacity by 100% during the next few years. Reportedly IPC has agreed to add 200,000 b/d to its pipeline capacity to the Mediterranean; this, added to the deep-water terminal to be constructed on the Persian Gulf, would raise capacity to 1.4 million b/d within a few years. The artificial island near Fao reportedly would cost nearly $80 million; however, a much discussed proposal to use Kuwait's Mina al-Ahmadi port as an outlet has not proved productive. The new terminal would permit raising Basrah field exports from about 150,000 b/d at present to 500,000 b/d or 600,000 b/d. Location for the new port was approved by Iraq's King Faisal Umm Qasr, at the mouth of the Shat al Arab River on the Persian Gulf.

## SOUTH IRAQ

(Data as of 1/1/58)




## REFINERIES IN IRAQ—1957

| *Name of Company* | *Plant Location* | *Crude Capacity* | *Type Plant* | *Cracking Capacity* |
|---|---|---|---|---|
| Kanaquin Oil Co. Ltd. | Alwand | 11,000 | S | — |
| | Basrah | 3,430 | S | — |
| Government Oil Refineries | Baghdad [1] | 30,000 | Comp. | 18,000T |
| | Qaiyarah | 1,200 | A | — |
| | Total | 45,630 | | 18,000T |

[1] Thermal reforming capacity 8,000 b/d; cat. cracker planned; capacity of plant to be increased to 50,000 b/d and 5,000 b/d cat reformer to be installed.

Capacities are in barrels per day. Key to type of plant: S—skimming; A—asphalt; Comp.—Complete. Under cracking capacity to indicate type: T—thermal: All data as of December 1, 1957.

## Oil Law Summary★

*There is no general oil law. Country is covered by 4 concessions. Principal three concession terms are similar, and summarized below.*

**EXPLORATION - EXPLOITATION:** Four concessions are involved, one to Iraq Petroleum Co. (IPC), another to Mosul Petroleum Co. (MPC), another to Basrah Petroleum Co. (BPC), and another to Anglo Iranian Oil Co., known as AIOC. Provisions for all these concessions are similar. **Duration:** 75 yrs. **Surrender:** Any time. **Scope:** Covers exploration, exploitation, refining, transportation, and export. **Arbitration:** Arbitration Board for settlement of disputes. **Labor:** must use nationals when possible and train for skilled jobs. **Drilling Obligation:** Geological survey in 8 months. For BPC and MPC drilling in 18 months and 3 yrs., respectively. **Construction:** MPC and BPC to construct 20,-500-bbl.-per-day pipeline on commercial production. IPC to construct min. 61,500-bbl.-per-day capacity line. BPC and MPC to begin exports within 7½ yrs. **Company Formation:** Companies must be British with British chairman. One Iraqi on board, appointed by govt. In 1951 this was raised to two Iraqis. Concessionaires may freely create subsidiaries in Iraq, giving general public opportunity to subscribe 20% of stock. **Income Tax:** All previous royalty and dead rents suspended in 1952, replaced by 50-50 payments arrangement for IPC, BPC, and MPC. Govt. receives ½ profit before foreign taxes. Profits defined as difference between "actual" cost of oil, and "border value." Actual costs set at 13 shillings per ton in 1953 or 43 US cents per barrel until 10% fluctuation occurred. This covers cost of production, depreciation, and amortization. Border value determined for 36 API gravity Kirkuk crude at $2.00 per barrel on Syrian border, and $2.07 at Fao port. 1% discount for bulk sales given. **Minimum Production:** Min. of 440,000 bbl. daily for IPC and MPC and 160,000 bbl. daily for BPC, unless prevented by reasons beyond company control. Govt. share cannot be less than 25,-000,000 pounds sterling from 1955 on. **Govt. Shares:** Govt. may require 12½% annual production delivered f.o.b. terminal for sale by govt. Value thereof deductible from company's income tax. **Other Taxes:** Payment of 20,000 pounds yearly made in lieu of other taxes. Also deductible from income tax. Excise tax levied on refinery production. Preferential prices for government's refinery supply at Baghdad of 10¢ per barrel applies.

★Taken from *World Petroleum Legislation*, 604 Fifth Ave., N. Y. 20, N. Y. (see p's 37-38)

### NATIONAL FACTORS

Considerable development plans are under way in Iraq, as covered in *World Petroleum Report 1957*. During 1957, these development plans were threatened by the loss in oil revenue brought about by the lowered exports of oil due to the Syrian destruction of pipelines. Total payments to the government of Iraq by the oil companies during 1957 were 48,920,274 dinars (about $137 million) compared with 58,874,133 dinars ($155 million) during 1956. Fourth-quarter oil revenues were about 17 million dinars ($47.6 million). During mid-1957, Iraq Petroleum Co. agreed to loan the Iraq government up to 25 million dinars ($70 million) as an advance on oil royalties. It was about equivalent to Iraq's loss of oil revenues during the first 3 months of 1957. This was necessary to the government to meet commitments under its budget.

During 1957, a 4-year suit by the government against IPC was settled on IPC's payment of $19.5 million. Also during 1957, the government indicated it will not approve IPC's 1956 oil accounts, but will refer the matter to arbitration. The dispute centers over the posted price at Fao oil terminal, on the Persian Gulf, where posted price was cut 5 cents per barrel during 1956. Iraq complained that BPC, IPC's affiliate, was the only one on the Persian Gulf which had decreased its price at that time. A second dispute is being investigated by chartered accountants concerning actual costs in 1955.

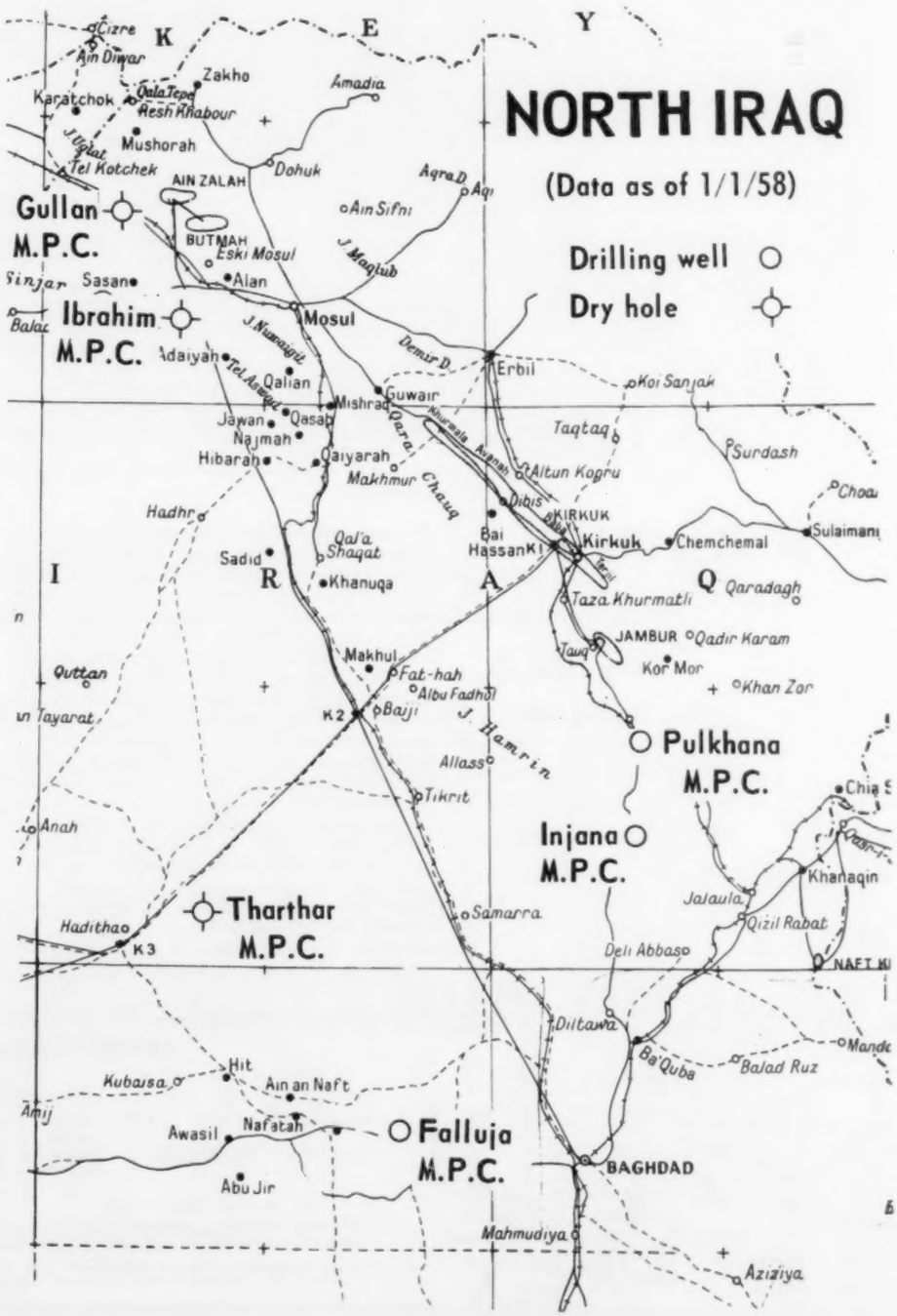
During 1957, it was announced that a 2% sales discount given off posted prices to owner companies of IPC would be reduced to 1%.

**IRAQ—OIL-COMPANY PAYMENTS TO IRAQI GOVERNMENT**

| By Quarters (Total) | 1957 | 1956 |
|---|---|---|
| 1st 3 quarters (9 months) | $90,000,000 | $155,000,000 |
| 2nd quarter | 33,600,000 | 53,200,000 |
| 3rd quarter | 48,500,000 | N.A. |
| 4th quarter (estimate) | 47,600,000 | N.A. |

NA—Not available.

This is retroactive to January 1, 1957. The increase in revenue to Iraq will be about $1.4 million. The discount is based on the actual posted price at Fao, on the Persian Gulf. END



# NEUTRAL ZONE

## PHYSICAL DEVELOPMENT

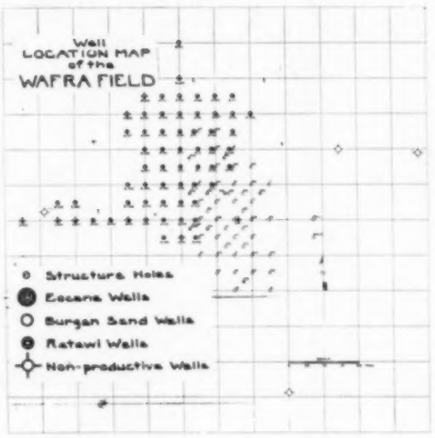
**Exploration:** During 1957, no geological or geophysical exploration was carried on by American Independent Oil Co. or Getty Oil Co. in the Kuwait-Saudi Arabia Neutral Zone. Drilling was confined to development wells in the Eocene, Burgan, and Ratawi zones. The number of wells drilled in each of the zones was: 47 Eocene, average depth 1,200 ft.; 4 Burgan, average depth 3,600 ft.; 6 Ratawi, average depth 7,000 ft.

**Production:** Total production from the three zones has shown a consistent monthly growth, being approximately 38,500 b/d during January 1957, and estimated at approximately 90,000 b/d during December 1957. At this latter figure, production may be broken down as follows:

*Barrels Per Day*
Eocene—15,000
Burgan—55,000
Ratawi—20,000

The recoverable reserves of the Eocene have been estimated at approximately 80,000,000 bbl., and the Burgan at 288,000,000. Sufficient data have not been obtained to estimate the Ratawi reserves.

With increased production, both American Independent Oil Co. and Getty Oil Co. have




embarked on programs to increase oil storage—both at their field installations and marine terminals. Pipeline capacity has also been increased, and American Independent has been building housing and related camp facilities at its field gathering center at Wafra and at its marine terminal at Mena Abdulla.

At the present time, additional development wells are being drilled to the Eocene and Ratawi zones, and no further drilling is contemplated to the Burgan zone. It is expected that some wildcat drilling may be undertaken during 1958.

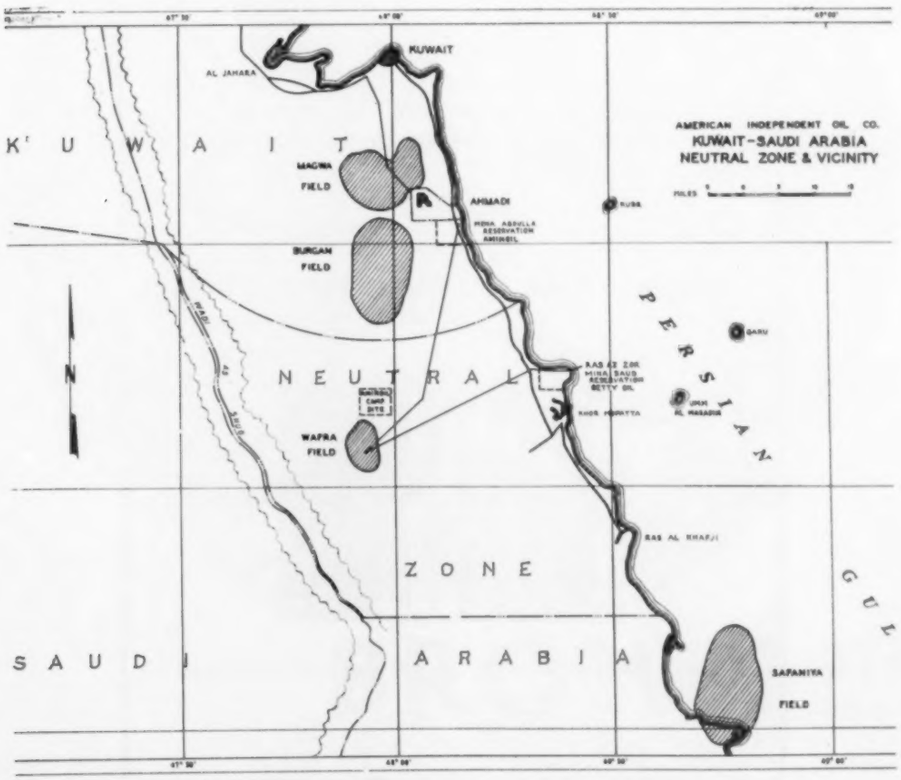
In December 1957, a concession was granted by Saudi Arabia over its undivided half in the Neutral Zone offshore area to the Japan Petroleum Export Co. Terms of the concession are given in the Saudi Arabian section. The new agreement provides for a take by the government of Saudi Arabia of at least 56%. There is some doubt as to whether royalty is a credit against tax: if it is not, the division would be even more in favor of the government.

**NEUTRAL ZONE—OIL EXPORTS 1957**
(1st 7 months) (Barrels)

| | |
|---|---|
| Neutral Zone (crude): | |
| Am. Independent Oil Co. | 4,249,983 |
| Getty Oil Co. | 6,539,536 |
| Total | 221,388,266 |

### JAPANESE CONTRACT SUMMARY

Concession contract over Saudi Arabia's interest in the Kuwait-Saudi Arab Neutral Zone signed Dec. 9 by Saudi government. Principal terms: **Duration:** 2 years. Extendible 2 years if 3 rigs working and 10,000 ft. well drilled. If commercial discovery made (defined as 1,500 b/d for 30 days), 40-year exploitation concession granted over same area. **Area:** Offshore area of Neutral Zone from line six sea miles from mean low-water mark out to median line between Iran and Neutral Zone. **Annual Rent:** $1.5 million yearly (all payments in US$) till discovery, $1 yearly for each year elapsed before commercial discovery made. Payments not deductible from income tax. **Royalty:** 20%, in kind or cash. Minimum royalty $2.5 million. **Income Tax:** 50% net profits plus supplementary tax to bring government share to 56%. Whether royalty is deductible from this is not clear. **Import Exemption:** Company exempt on materials imported for operations. **Govt. Oil Purchase:** May purchase up to 10% company production at 5% discount, for govt. use only. **Refining Obligation:** Begin construction refinery on 30,000 b/d production, and at 75,000 b/d must build refinery for 30% production. **Directors:** Govt. nominates two directors. **Stock:** Govt. or Saudi nationals may buy 10% of stock. **Employment:** 70% Saudi. **Expiration:** All materials revert to govt.




In any event, the contract provides for a relatively cheap exploration period during which the Japanese company can look over the area. It lies directly above the Safaniya field which Aramco is developing.

During 1957, a dispute arose between Getty Oil Co. and American Independent concerning the two islands of Qaru and Umm al-Maradim which lie off the Neutral Zone coast. The concessions of both companies include territorial waters and "islands, if any." Both islands lie considerably outside the 6-mile limit considered the border of Neutral Zone's territorial waters. Qaru is about 24 miles out, and Umm al-Maradim is about 14 miles out. The islands also include territorial waters extending outward

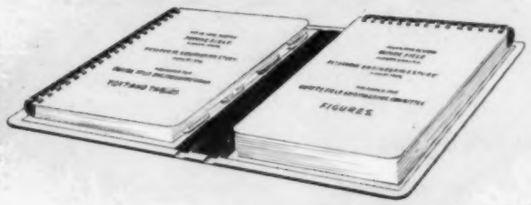
from them six miles from low tide. Saudi Arabia has demanded a half interest in the islands also. The question has not been settled yet, because the treaty which established the Neutral Zone does not specify ownership of the islands. END

## *Neutral Zone—Getty Oil Company Concession*

**CONCESSION TERMS: Duration:** 60 years. **Area:** All Saudi Arab interest in Kuwait-Saudi Arab half of Neutral Zone. Includes territorial waters. **Initial Payment:** $9.5 million on signature. **Royalty:** 55 U. S. cents per barrel for crude produced. 12½% royalty on natural gas sales. Minimum royalty $1 million yearly. **Profits Division:** 25% net profits during year payable to government. 20% net profits of operation of any refinery payable to government. Government share free of foreign taxes. **Government Purchase:** 20% of production may be purchased by government at 5% discount for own use and not export. **Refining:** Must build 12,000 b/b refinery when production reaches 75,000 b/b. Must supply 100,000 gallons of gasoline and 50,000 gallons kerosine to government free of charge. **Transfer:** Only with written approval of government, however may transfer to any American or Western European corporation with assets of $30 million if agree to pay government 25% of net capital gain from sale. **Government Participation:** If company offers stock in operating subsidiary to any other purchasers, government may purchase 25% of shares. **Drilling Obligation:** 6,000 feet by end of second year, 16,000 feet by end of third year. **Employment:** Must employ Saudi Arabs or other Arabs to greatest extent possible. May employ foreign skilled personnel as needed. Must establish schools and educational facilities when production reaches 15,000 b/b for 30 days. **Export:** Must give priority on purchase of products to domestic purchases or purchasers within friendly Arab nations. May not sell to foreign power hostile to Saudi Arab government. **Political:** May not interfere in government policy. May not interfere with any government obligation from treaty or other concessions. **Pipeline:** May not have pipeline outside neutral zone. **Technical:** All technical requirements of petroleum engineering and practice at sole discretion of company. **Arbitration:** Disputes subject to arbitration, one arbitrator nominated by company and government, third referee chosen by arbitrators. **Surrender:** On 6 months' notice. Must pay 3 years' minimum royalty. **Taxation:** Not subject to any taxes by government on any aspect of operations.

**NEUTRAL ZONE—AMINOIL CONCESSION: Concession TERMS: Duration:** 60 years. **Area:** Kuwait's interest over neutral zone and territorial waters. **Drilling Obligation:** 400 feet by end of 4 years, 16,000 feet by end of 10 years, 40,000 feet at end of 20 years. **Refining:** Must construct refinery when production reaches 105,000 b/b of 10,500 b/b capacity. **Employment:** Must give preference to Kuwaitis, secondly to Arabs. May employ foreigners for technical positions. **Education:** Must begin program within 4 years following discovery. **Hospital:** Must begin construction 30-bed hospital in city of Kuwait. **Initial Bonus:** $7.25 million in U. S. dollars. **Royalty:** 35.5 U. S cents per barrel, minimum $625,000 per year. Royalty on natural gas sales 12½%. **Government:** Sheikh of Kuwait granted 15% equity interest in any subsidiary formed to explore in neutral zone or exploit. Refinery must be owned by subsidiary in which Sheikh of Kuwait granted 15% interest. **Import Duties:** Company exempt from import, export and customs duties. As consideration for exemption pays 7.5 U. S. cents per English ton of crude oil produced.

★Source: *World Petroleum Legislation*, 604 Fifth Ave., New York 20, N. Y. (see p's 37-38)

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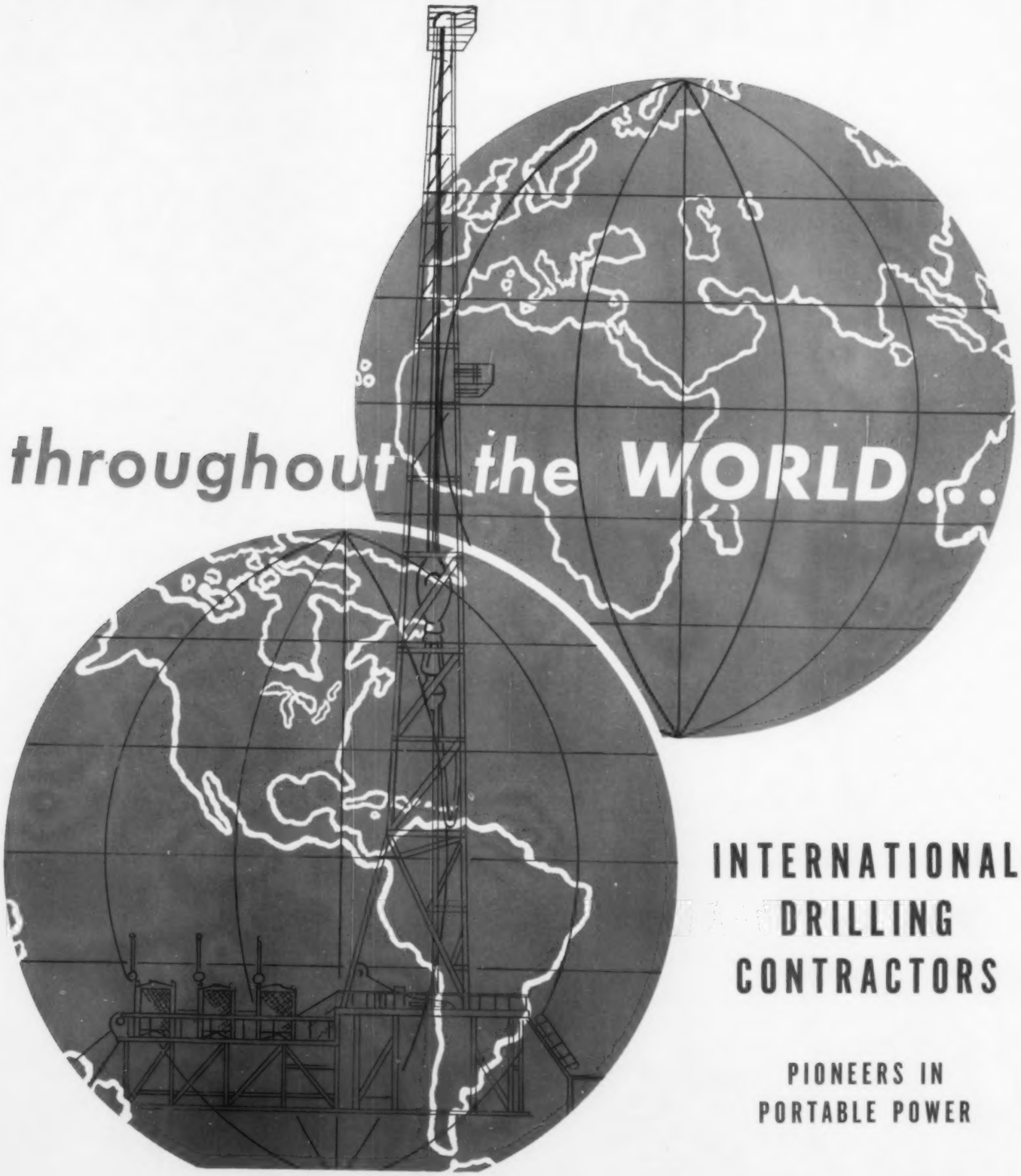


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# TURKEY

## PHYSICAL DEVELOPMENT

**Exploration:** Several companies began drilling during 1957 and more will drill during 1958, under exploration licenses indicated on the accompanying map.

The Atlantic Refining Co. planned to begin drilling in 1957. Tidewater-Atlantic-Seaboard group spudded its first exploratory well at the top of Mount Bakuk in southeastern Turkey, about 40 miles southeast of Mardin, or around 30 miles northeast of Nusaybin. A 15,000-ft. rig is being used. International Brown Drilling Corp. is the contractor. American Overseas Petroleum Ltd. spudded in its second well in Turkey, at Kahta Cayi structure, 17 miles southeast of the provincial capital of Adiyaman. It is in the Gaziantep area, 70 miles northeast of the first Amoseas well in Turkey, Aril No. 1, abandoned at 10,153 ft. Amoseas, a member of the Caltex group, is exploring for Texaco Overseas Petroleum Co. and California Asiatic Oil Co., the concession holders.

A farmout by Gilliland Oil Co., a Los Angeles independent, is held by Turkish-American Oil Co. The first well was temporarily suspended at 7,900 ft., near Cizre, close to the Iraq-Syria border. No shows were encountered. The well will be resumed in the spring of 1958.

Marmara Petroleum Corp. has completed a gravity survey of its four licenses in Petroleum District No. 1, in Thrace—using Seismos Exploration Co., of Hanover, Germany. In addition to the gravity work conducted on these four licenses, it has done a good deal of geological work, using two field parties. It has commenced a seismic exploration program—the work being done by Western Geophysical Co. No plans for exploration drilling have been made, nor will any be made until after the seismic work has been completed.

Bolsa Chica plans to begin drilling in Zone 5V. Date for this well has not yet been set.

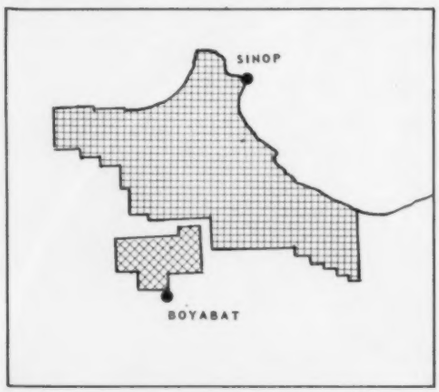
Deutsche Erdoel AG, a German company, will drill its first well soon. The company drilled a test, No. 1 El Bouav, in northeastern Syria during 1957.

Istanbul Tabii, partly owned by Ralph M. Parsons Co., has not drilled any wells so far, but has done geophysical work and some geological structure drilling. The company has no plans for immediate drilling.

Standard Oil (Turkey) Inc., a Jersey Standard affiliate, spudded its first test in Thrace at Celan 1, April 15, 1957. It was abandoned dry, at 4,350 ft., about June 1. The rig was moved to Ozmancik, about 5 miles west, and is drilling there. Discovery was reported during late 1957, but denied by the company.

Shell will drill a wildcat early in 1958 in Thrace, some 10 kilometers north of Babaeski. Keir and Cawder, of Glasgow, Scotland, are contractors. The three geological, two gravity, and two seismic parties operating in 1957 will continue in 1958.

**Production:** Production is mostly from the Raman field, discovered some years ago. Potential is about 7,000 b/d. During 1957, production averaged about 5,800 b/d. The Garzan field has about 8 wells, of which 6 are shut in. There are 12 wells in Raman field, with 8 shut in.




Bolsa Chica Oil Corp.

California Asiatic Oil Co.
Texaco Overseas Petroleum Co.

Deilmann Montan G.m.b.H.

D.D. Feldman Oil & Gas

Deutsche Erdol–AG

Esso Standard (Turkey) Inc.

Gilliland Oil Corp.

Istanbul Tabii Gaz Ltd. St.

Marmara Petroleum Corp.

Mobil Exploration Mediterranean

N.V. de Bataafsche Pet. Mij.

Turkiye Petrolleri A.O.

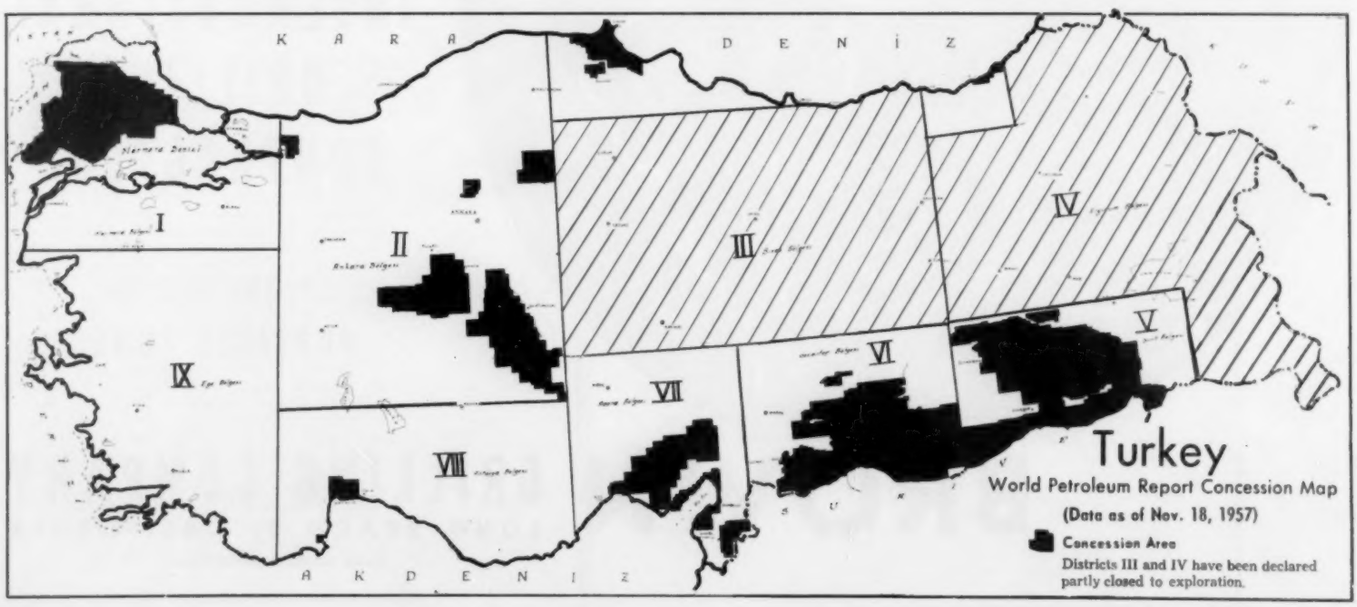
Tidewater Oil Co.
Atlantic Refining Co.
Seaboard Oil Co.

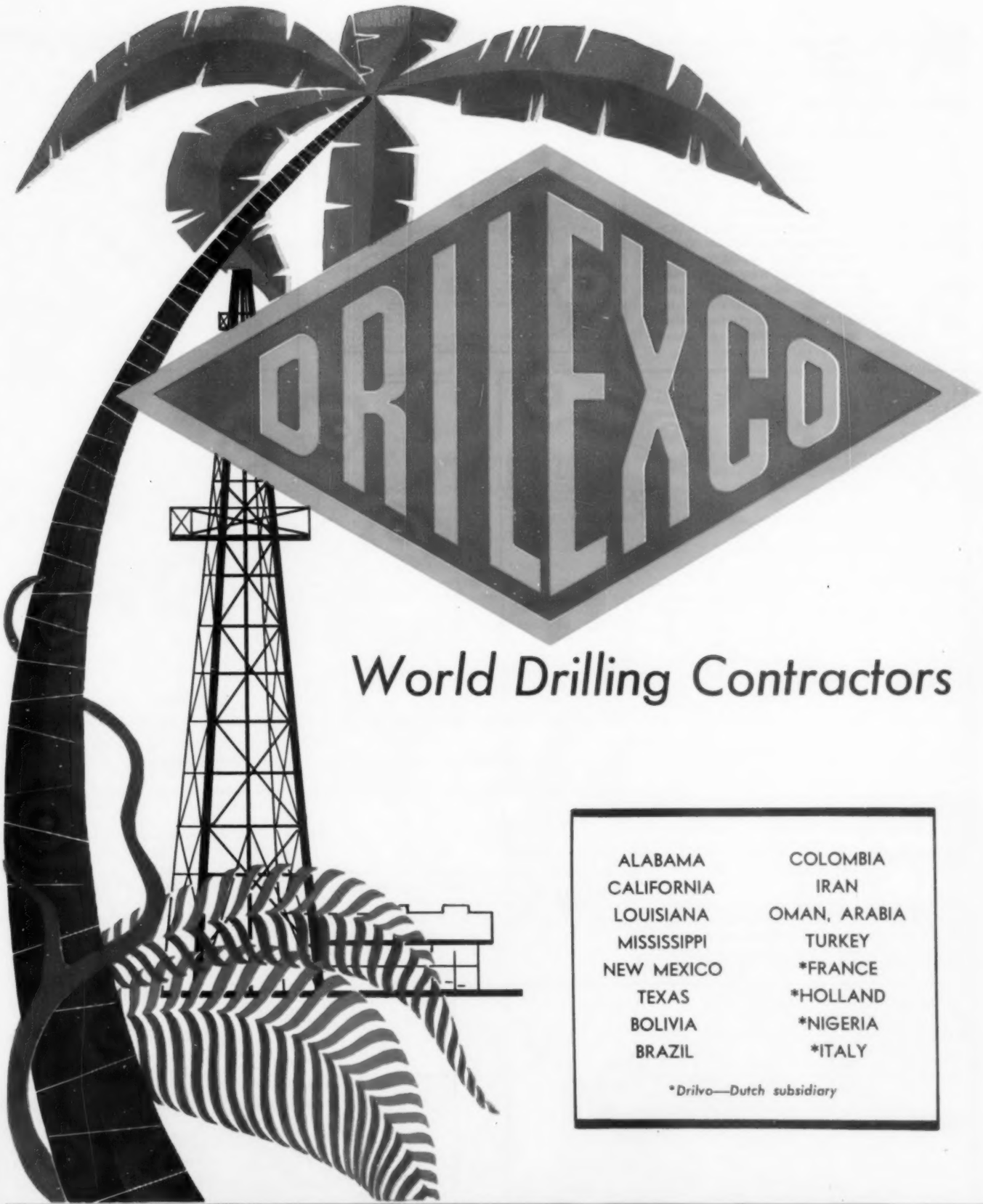
Etta Limited Co.

Under Application

**Refining:** A new 65,000 b/d refinery in Turkey has been announced by Mobil Overseas Oil Co. Inc. Scheduled to go onstream in 1960, the refinery will be built, as requested by the Turkish government, by a group of companies composed of Mobil Overseas Co., British Petroleum Co., California Texas Corp., and the Royal Dutch-Shell group. Ownership will be Mobil, 37%; Caltex, 34%; Shell, 18%; BP, 11%.

Another refinery was proposed for Izmit, near Istanbul. William Blair, a Chicago financier, reportedly put up $10 million for the project—the remaining $5 million to be contributed by Turkish sources. This project has not yet begun.






*World Drilling Contractors*

| | |
|---|---|
| ALABAMA | COLOMBIA |
| CALIFORNIA | IRAN |
| LOUISIANA | OMAN, ARABIA |
| MISSISSIPPI | TURKEY |
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*Drilvo—Dutch subsidiary

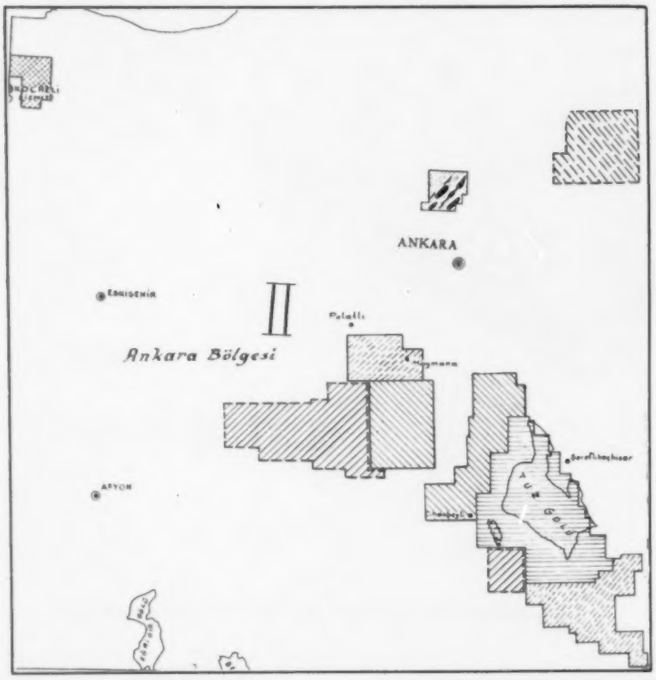
**DRILLING AND EXPLORATION COMPANY OF DELAWARE, INC.**

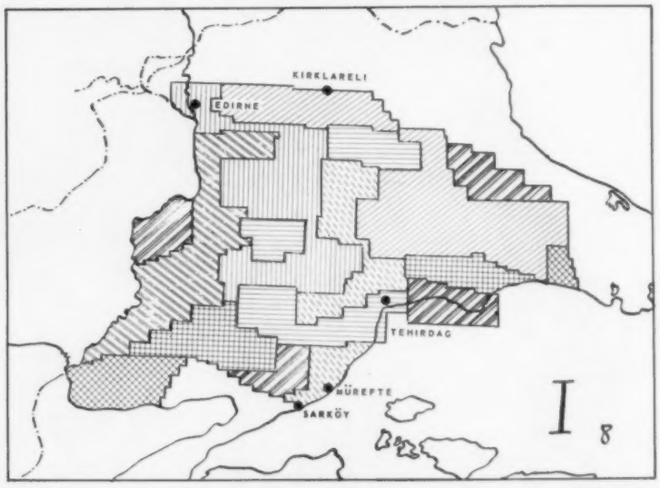
EXCHANGE BANK BLDG., DALLAS, TEXAS

CABLE ADDRESS: DRILEXCO—DALLAS, TEXAS

**Transportation:** Two products lines have been completed in the past two years—one covering 250 miles from Antalaya north to Eskisehir, and a 200-mile 4-in. line from Eskisehir to Panerma. Both are finished. A 450-mile 8-, 6-, 4-in. products line for NATO, from Iskenderum to Batimn, was begun in 1955, and is still under way.

During 1957, a 1,500 mile-pipeline costing an estimated $840 million was proposed. The 40-in. line would handle 1,400,000 b/d of Middle East crude, and would run from the Persian Gulf to Iskenderun. This line was to be a supplement to existing supply routes of the Middle East. It was not built due to opposition from the oil-producing countries of Iraq and Kuwait, as well from sources who believe tanker transportation should be relied upon to supply increased demand for Middle East crudes, rather than the highly vulnerable pipelines.



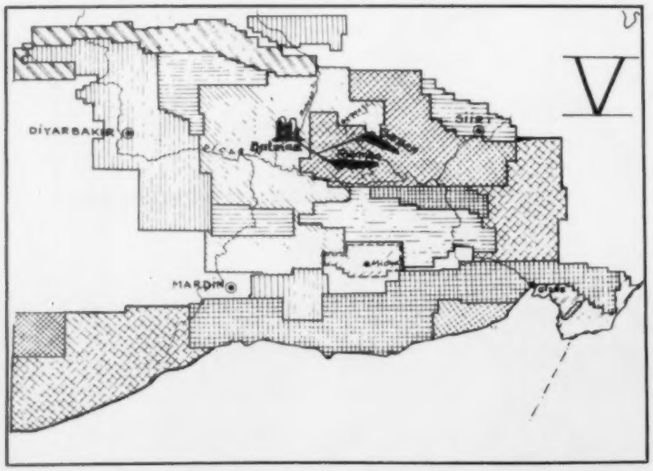



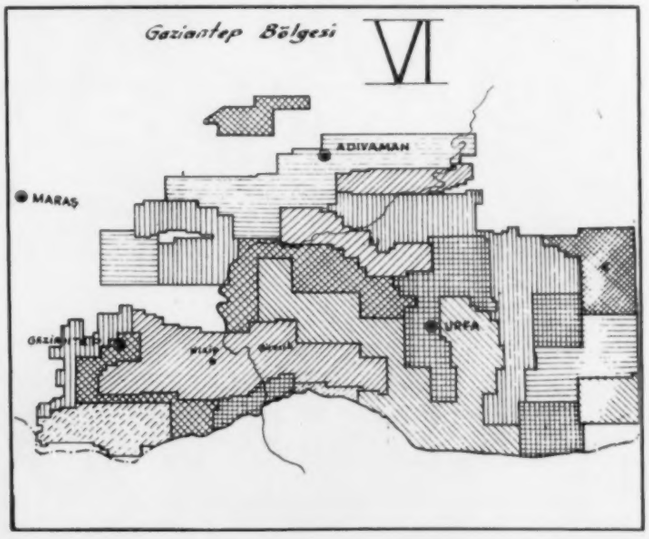

## OIL LAWS

On June 6, 1957, amendments were passed to the Turkish oil law to allow transportation and refining of crude petroleum of foreign origin within Turkey—thus permitting refinery construction without awaiting a full supply of crude locally. Needs of Turkey for domestic consumption are given priority before export. The Council of Ministers is given power to specify a legal regulation for crude pipelines carrying oil from one foreign country to another across Turkey, a provision designed in the event the 40-in. pipeline previously mentioned should be built. The law amendment allows holders of oil rights to own land on which a refinery may be built. It provides normal taxes for a refinery, other than those governing exploitation of crude oil.

## NATIONAL FACTORS

No changes of note occurred in the national



## Oil Law Summary★

**RECONNAISSANCE:** Preliminary reconnaissance permitted. No tax or operating requirements.

**EXPLORATION: Duration:** 6 yrs. Two extensions of two years each possible. 5 yrs. extension given if production obtained. **Area:** 123,500 acres per concession. Maximum 8 concessions in one district per concessionaire. **Surface Tax:** 7¢ per acre first and second year, rising to 42¢ per acre in 11th and following years. Exploration expenses 80% creditable against surface tax. **Drilling Obligation:** Drilling must begin not later than 5th yr. Must begin within two years on another license in same area. Within 5 yrs. following discovery, drilling must have begun on all outstanding licenses. **Surrender:** Any time on one month's notice, in all or part.

**EXPLOITATION: Area:** Maximum ½ exploration area to 62,500 acres. Right to this area guaranteed. Maximum per concessionaire in one district 375,000 acres. **Duration:** 40 yrs. Renewable for 20 more years on government's permission. Commercial production must begin within 3 yrs. or lease may be cancelled by government. **Surrender:** In whole or part at any time on 3 months' notice. **Surface Tax:** 42¢ first year, rising to $1.12 per acre during 5th yr. and thereafter. Amounts paid creditable against royalty. **Royalty:** 12½%, payable in cash or in kind. **Income Tax:** 50% of net income. **Depletion Allowance:** 27½% of gross income up to 50% of net. **Local Consumption:** Producer must supply local consumption before export. **Export:** No export duty assessed. Operator exempt from import and customs duty. Profits remittable on application. **Employment:** Foreign personnel may be used as needed. Must educate Turks up to 15% of number of foreign employees. **Transportation and Refining:** No obligation. Exploitation concession gives right to receive "certificate for transportation and refining."

★Taken from *World Petroleum Legislation*, 604 Fifth Ave., N. Y. 20, N. Y. (see p's 37-38)

factors which influenced investment favorability of Turkey. The country remained politically stable—with a friendly attitude toward investment of foreign capital. There was no change in the national factors listed in *World Petroleum Report 1957*. The economic situation of the country has not improved, and the gap between official exchange rate and the black-market rate for Turkish lire widened during the year. As of March 1957, the black-market value of the Turkish lire was 15.25 per US dollar. This compares with the official exchange rate of 2.80 lire per dollar. Government expenditures are high, and the decline in the Turkish lire is expected to continue. END

# SYRIA

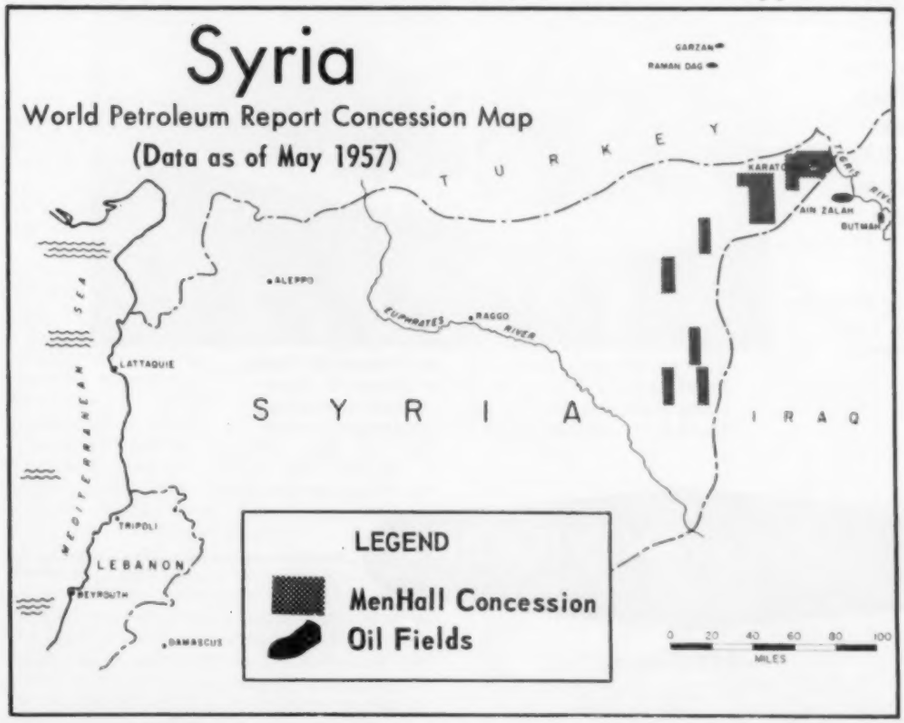
### PHYSICAL DEVELOPMENT

**Exploration:** Syria's first oil discovery was made during 1956, at Karatchok, by James Menhall Drilling Co. Approximately 90 ft. of Cretaceous pay was discovered at about 6,500 ft. The well was a commercial producer at about 1,000 b/d. A second test during 1957, about 1½ miles from the discovery, found oil at 5,870 ft. A third test is now drilling nearby, and a fourth is being spudded. A total of 12 wells is planned by the end of 1958. The Atlantic Refining Co. holds a 50% interest in the concession, and Portsmouth Steel Corp. also holds an interest. A German company, Deutsche Erdoel AG, is now below 4,700 ft. at its first wildcat location in the Ghouna area of Jezira province, near Turkey. A second well is planned for early in 1958. The company had difficulties when export licenses for USA equipment were refused during political upheavals in Syria.

Under an economic agreement signed with Russia, October 28, 1957, a concession for exploration over 50,000 square kilometers was received by Russia. A technical survey map of the area will be made, on a scale of 1:200,000 —with 2,000 linear kilometers of seismic prospecting work, and drilling of 18 wells in the northeast of Syria up to a total depth of 36,000 meters. Equipment and material also will be provided by the Russians.

**Refining:** There are no refineries in Syria at present; however, a 20,000 b/d plant is being constructed by a Czechoslovakian company, Czech Techno Export, at Homs. Construction began, October 15, 1957, after about a year of negotiation at bids by companies from the West. The contract provides for 25% payment in Syrian pounds.

**Transportation:** During the Suez crisis, the pumping stations on the IPC pipelines from Iraq were blown up. Two of the stations were destroyed, and a third badly damaged. Flow of oil fell to about 220,000 b/d during the crisis, and Syria refused to permit the company to repair the lines until Israeli troops had withdrawn from Egypt. Permission finally was granted; construction was begun to repair the damage; but at the end of 1957 the lines had not been completely repaired.




### NATIONAL FACTORS

The investment climate in Syria worsened considerably during 1957, when the pro-Soviet government took over the country through installation of General Afif Bizri, as head of the army. The shakeup was believed to be guided by Colonel Serraj, head of the army intelligence service. During the year, Syria accused the United States of attempting to overthrow the government, and banished a USA military attache and two other diplomats from the country.

The Syrian parliament passed a bill to the effect that companies whose operations had been interrupted for reasons beyond their control must pay full wages for the idle period. Iraq Petroleum Co. thereby was forced to pay full wages to workers idled during repair to the company's pipelines. END

## Syria
## Oil Law Summary★

*All subsoil rights reserved to the State.*

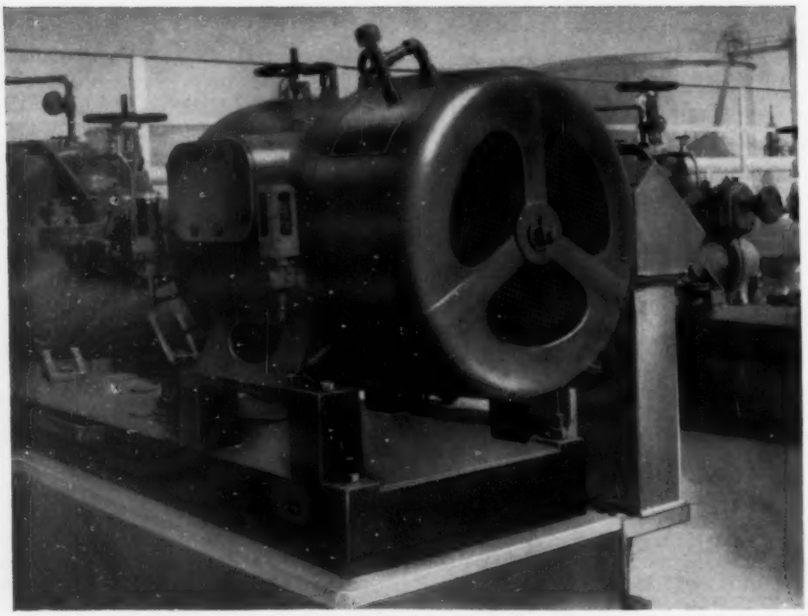
**RECONNAISSANCE:** Permit may be received for one year, at government discretion.

**EXPLORATION: Duration:** Four years. Assured renewal for equal period. **Annual Fee:** On reconnaissance permit, US $45.40 during initial term, US $90.80 during renewals. Payable annually. On exploration concession, US $454 payable the first year per concession, annual payment rising to US $1,128 in eighth year and thereafter. **Surface Tax:** 4.5 US cents per acre payable annually during life of concession.

**EXPLOITATION:** Exploitation concession guaranteed to holder of exploration concession over same area. Must be approved by special law to define area, duration, and other terms which are not spelled out in present laws. **Minimum Tax:** Fiscal requirements of exploitation concession may not be less than 50% of net profits. **Ownership Restrictions:** None. Decree 151 does not apply.

★Taken from *World Petroleum Legislation*, 604 Fifth Ave., N. Y. 20, N. Y. (see p's 37-38)

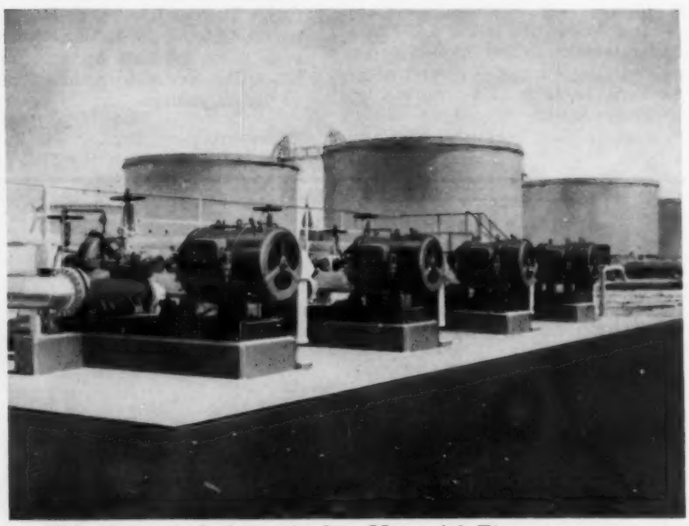
# Flameproof Motors for the Oil Industry



A. Metrovick 250 h. p. 1480 r. p. m. Flameproof Squirrel Cage Motor—one of four supplied to the Kwinana Oil Refinery

**Oil wells and refineries throughout the world rely on M-V equipment. Metrovick experience of motors and their proper application covers all drives in the oil industry, from drilling to refining. Some of the refineries using Metrovick motors are the Grangemouth Petroleum Refinery, Ltd., Shell Stanlow Refinery, Esso Refinery, Fawley, Trinidad Leaseholds Point-a-Pierre Refinery, B.W.I., and (illustrated) British Petroleum Company's Refinery at Kwinana, Australia.**

Special arrangements were put in hand to guarantee that these motors were delivered to meet site requirements.



This photograph shows the four Metrovick Flameproof Motors driving kerosene pumps at Tank Farm Pumping Station No. 3. These motors are fitted with constant-level oil lubricators.

METROPOLITAN-VICKERS
ELECTRICAL CO LTD · TRAFFORD PARK · MANCHESTER, 17

IX/8501

*An A.E.I. Company*

# SAUDIA ARABIA

## PHYSICAL DEVELOPMENT

**Exploration:** Outstanding development in exploration during 1957 was discovery of oil in a wildcat well 90 miles northeast of Riyadh. The well, known as Khurais No. 1, is the first to be drilled on the Khurais structure, which is in the Dahana—a belt of sand dunes east of the central plateau. The structure was located by gravity-meter and structure-drill surveys. Drill-stem tests of the Arab "D" member of the Arab zone between 4,755 ft. and 4,898 ft. indicated production rates up to 3,000 b/d. Gravity is 31 API at 60 F, and the oil is sour.

Khursaniyah No. 2, the first delineation well drilled since the discovery of the Khursaniyah field in 1956, located four miles north-northeast of the discovery well, was drilled to a total depth of 7,885 ft. It defined the northern limit of the field. The various producing members, which had been oil-bearing in the discovery well, contained water. Delineation of the field is continuing. Khursaniyah well No. 3 has been spudded three miles south-southeast of the discovery well.

An exploratory well, 12 miles north-northwest of the northernmost well in the 140-mile-long Ghawar field, was drilled to a total depth of 7,325 ft. and completed at a depth of 7,120 ft. for potential production from the "D" member of the Arab zone.

In December, 1957, Aramco announced discovery of a second offshore oil field. In a drill-stem test, oil was found in a wildcat well known as Manifa No. 1, located in the Persian Gulf about eight miles off the coast of Saudi Arabia and 120 miles northwest of Dhahran, Aramco's headquarters.

The Manifa discovery was made in an interval tentatively identified as the Arab "A" member of the Arab zone. A drill-stem test between 8,747 ft. and 8,794 ft. brought gas to the surface in 3 min. and oil in 20 min. Preliminary tests indicate the crude oil has a corrected gravity of 28 API, and is sour; 7-in. casing was set at 8,730 ft. before the test. Coring of the Arab zone continues. In the Sulaiy limestone just above the anhydrite cap rock of the Arab zone, oil shows were encountered also. Production possibilities of this limestone are yet to be determined.

During the 1956-57 season, eight exploration parties were active over the approximately 365,000 square miles of Aramco's concession area. Four of them were seismic parties; three were structure-drill parties; and one was a gravity-magnetic party. Two structure-drill and two seismograph parties operated in the northerly half of the concession area. One structure-drill, one gravity-magnetic, and two seismograph parties operated in the Rub' al-Khali in the southern part of Saudi Arabia.

During 1957, several new companies were interested in oil rights offshore and onshore. They included Atlantic Refining Co., Conorada Petroleum Corp., Indiana Standard, and a Japanese company, Arabian Oil Co. Ltd. The latter company received a concession during early December over the Saudi Arab part of the Kuwait-Saudi Arab Neutral Zone offshore rights, as summarized in the following section of this report. The company formed Japan Petroleum Export Co. to receive the rights. The company reportedly was capitalized at $10 million—of which some $1.1 million was to be raised through public investment and the rest by the sponsoring group, which included various electric-power and iron and steel interests.

**Production:** The Arabian American Oil Co. produced its three billionth barrel of oil Wednesday, December 4.

As of June 30, 1957, Aramco had 184 producing oil wells—a sharp increase from December 31, 1956, when only 114 wells were actually producing, due to closure of the Suez Canal when more than 50 wells capable of immediate production had been closed temporarily.

**SAUDI ARABIA—PRODUCTION BY FIELDS IN BARRELS**

| | 1956 Daily Average | Jan. 1-June 30, 1957 Daily Average |
|---|---|---|
| Abqaiq | 287,061 | 294,936 |
| Abu Hadriya | — | — |
| Dammam | 47,001 | 40,399 |
| Ghawar | | |
| 'Ain Dar | 310,022 | 230,338 |
| Huiya | — | — |
| Shedgum | 113,977 | 73,028 |
| 'Uthmaniyah | 196,390 | 202,728 |
| Qatif | 31,678 | 25,349 |
| Safaniya | — | 27,160 |
| Total | 986,129 | 893,938 |

The Safaniya field has been in production since April 12, 1957. It was the first offshore oil field to be discovered in the Persian Gulf, and is believed to be the biggest offshore field in the world. Safaniya is an elongated structure, with 64,000 acres proved productive. The field appears to be a relatively simple fold with very gentle flank dips. Potential production is from about 5,000 ft. to 5,600 ft. in two Cretaceous horizons, the upper and lower Bahrain sands. This is the only commercial Cretaceous production yet discovered in Saudi Arabia. An additional zone, the Zubair, also of Cretaceous age and occurring some 1,400 ft. below the lower Bahrain sand, has also been proved productive in three crestal wells.

## Oil Law Summary★

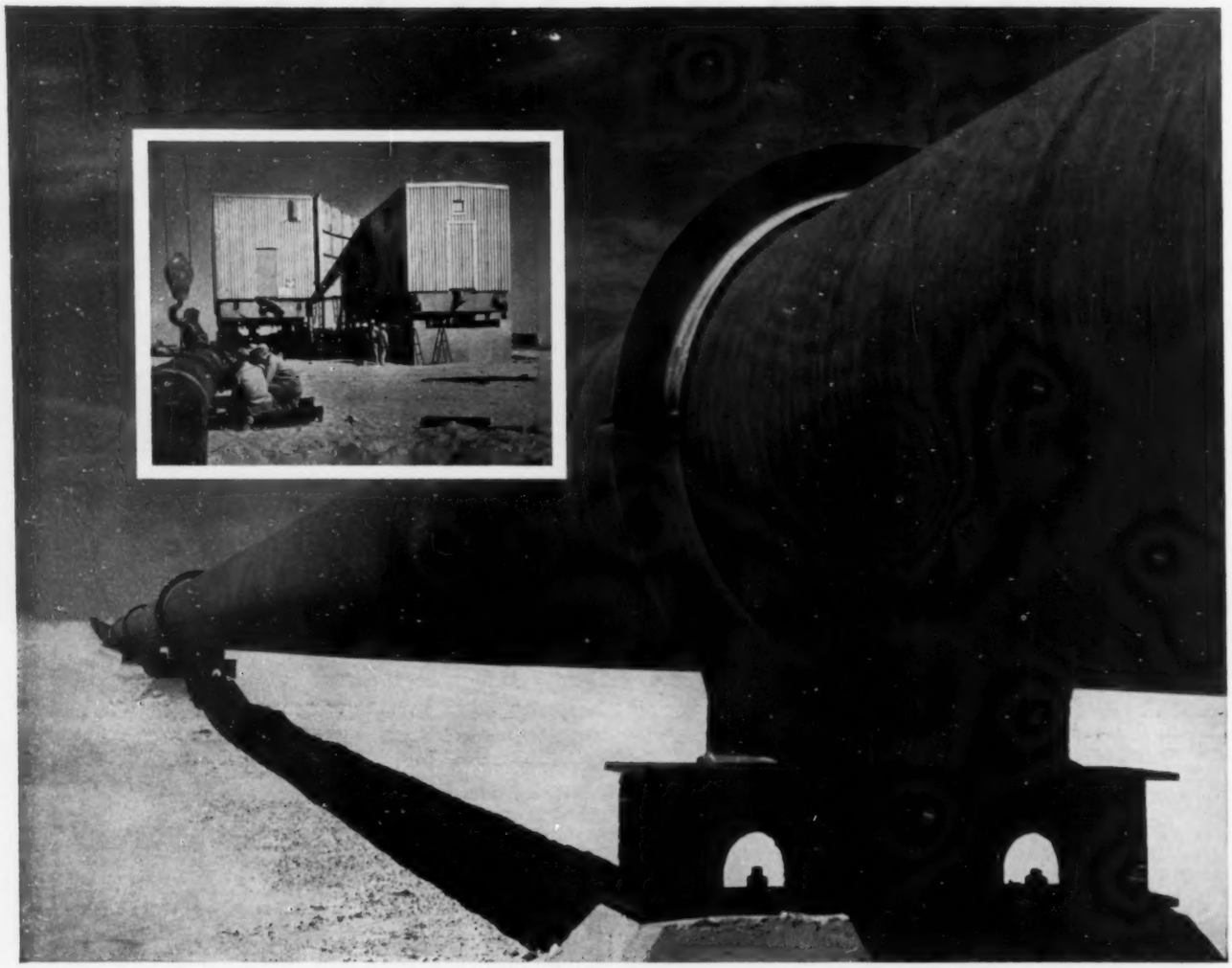
*No oil law. Aramco Concession covers most of country.* **ARAMCO CONCESSION** includes all operations except marketing within Saudi Arabia. **Area:** "Exclusive Area" covers all eastern Saudi Arabia including territorial waters, westward to westerly edge of Dahana and from north to south of Saudi Arabia. "Preferential Area" covers balance of eastern Saudi Arabia to border or contact between sedimentary and igneous formations. Aramco given right to hold this area by meeting offer of any other company. **Drilling Obligation:** Begin within 3 years, continue to commercial production. Thereafter continue with two strings. **Duration:** Sixty years. **Dead Rent:** Initial dead rents deductible from royalty. Annual dead rent 5,000 gold pounds. $700,000 yearly payable for support of government representatives. **Royalty:** 5 gold shillings per ton production, equivalent to about 22 US cents per barrel. Royalty on gas, 12½% on sales. Offshore royalty same as onshore, plus 5 US cents per barrel, payable in dollars. Minimum off-shore royalty $2 million yearly. **Income Tax:** 50% net income before foreign taxes. 50% is maximum after deduction of losses, depreciation, and foreign taxes. Taxes payable in currencies as received from sales. **Refining:** Company obligated to build refinery for government needs. **Government protection:** Government supplies soldiers as guards at company expense. **Employment:** Company may employ Americans, must use Saudi Arabs in so far as suitable. **Miscellaneous Rights:** Construction of roads, etc.; installation of machinery, drilling equipment; use of transportation; use of water. **Surrender:** Anytime, on 30 days notice. **Cancellation:** Only for non-payment or failure to begin drilling. **Arbitration:** By two arbitrators, plus one referee chosen by company and government. **Transfer:** Only with government consent. **Stock Ownership:** Subsidiaries organized by ARAMCO must offer 20% stock to Saudi Arabs. **Language:** English text of concession prevails. **Political:** No company personnel may interfere in Saudi Arabian politics.

★Source: *World Petroleum Legislation*, 604 Fifth Ave., New York 20, N. Y. (see p's 37-38)

**SAUDI ARABIA—STATUS OF WELLS AS OF JUNE 30, 1957**

| | COMPLETED | | | | | | | | UNCOMPLETED | |
|---|---|---|---|---|---|---|---|---|---|---|
| Field | Producing | (Abandoned) Oil | Drilling | Standing[2] | Shut-in[3] | Observation | Injection | Total | Suspended | Drilling |
| Abqaiq | 51 | 1 | 0 | 1 | 12 | 2 | 7 | 74 | 0 | 1 |
| Abu Hadriya | 0 | 0 | 2 | 1 | 0 | 1 | 0 | 4 | 0 | 0 |
| Dammam | 27[1] | 7[2] | 3 | 0 | 3 | 1 | 0 | 41 | 0 | 1 |
| El Alat | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| El Jauf | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| Fadhili | 0 | 0 | 0 | 1[5] | 0 | 0 | 0 | 1 | 0 | 0 |
| Ghawar: | | | | | | | | | | |
| 'Ain Dar | 46 | 0 | 1 | 5 | 2 | 2 | 0 | 56 | 0 | 0 |
| Shedgum | 11 | 0 | 1 | 0 | 0 | 1 | 0 | 13 | 0 | 0 |
| 'Uthmaniyah | 31 | 0 | 2 | 10 | 2 | 3 | 0 | 48 | 1 | 0 |
| Huiya | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 2 | 0 | 0 |
| Haradh | 0 | 0 | 0 | 7 | 0 | 1 | 0 | 8 | 1 | 0 |
| Khursaniyah | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 2 | 0 | 1 |
| Ma'aqala | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| Qatif | 10 | 0 | 1 | 0 | 0 | 1 | 0 | 12 | 1 | 0 |
| Safaniya | 11 | 0 | 0 | 13 | 0 | 1 | 0 | 25 | 0 | 1 |
| Stratigraphic Well | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| Total | 187 | 8 | 14 | 40 | 19 | 15 | 7 | 290 | 3 | 4 |

(1) Includes three producing gas wells.
(2) Includes two abandoned gas wells.
(3) A standing oil well has been completed as a producer but is not connected to surface facilities.
(4) A shut-in oil well is not producing.
(5) Well bore filled with mud.



# How General Electric Put More Push In a Desert Pipeline

It takes plenty of power to pump petroleum through the miles of the trans-Arabian pipeline system. Yet, if the Arabian American Oil Company and its sister organization – Trans-Arabian Pipe Line Company – were to gain the full capacity of present installations, even more powerful pumping facilities were needed. However, any new equipment would have to be able to meet the usual demanding field conditions of rigorous climate and minimum maintenance.

It was felt that a major part of the answer to the joint expansion might be found in unattended stations equipped with the G-E gas turbine. Trucked into the station at Wariah in the Aramco gathering system area, this 5000 h.p. turbine – the first of a projected six – and its accompanying control van with a 93-foot radio tower for remote telemetering were installed on permanent foundations and coupled "on stream." This unit will be fired with crude oil taken directly from the line.

Soon the remaining five G-E gas turbines ordered by Aramco and Tapline will be in operation up and down the 1,000 mile line. In addition, three base-mounted units will be housed in permanent pumping stations. Why not check into the advantages G-E gas turbines can bring your operation? Consult the General Electric representative nearest you, or write: *International General Electric Co., Dept. 57-34, 150 East 42nd Street, New York 17, N.Y., U.S.A.*

GENERAL ELECTRIC

—U.S.A.—

Safaniya's initial capacity of 50,000 b/d was quickly raised, through installation of additional pumping facilities, to 115,000 bbl. per calendar day by the summer of 1957. The capacity is scheduled to be increased to 175,000 bbl. per calendar day by the middle of 1958 by installation of a booster pump station at Khursaniyah, midway in the pipeline and adjacent to Khursaniyah field.

Recently Aramco began the construction of the 'Ain Dar gas-injection plant. The plant will inject the natural gas back into the oil reservoir to help maintain the reservoir pressure from five gas-oil separator plants—four of them in the 'Ain Dar area, and the fifth in the Shedgum area of Ghawar. It will reinject this gas into the crestal portion of 'Ain Dar.

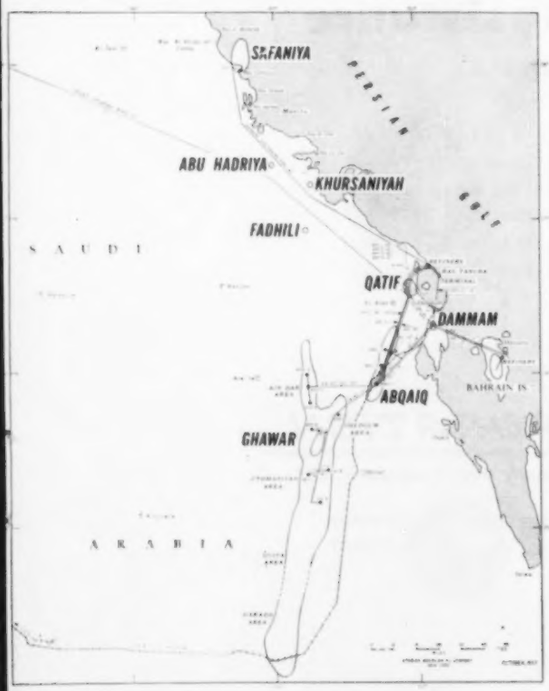
The facilities are being designed to inject approximately 200 million cubic feet per day. They will involve the use of five combustion-gas turbines and centrifugal compressors, built in the United States and Italy by Clark Bros. Brown & Root Inc., which designed gas-injection plants for the Creole Petroleum Corp. to use in the Lake Maracaibo area of Venezuela, has assisted in the design of the 'Ain Dar plant.

In the Abqaiq field, which had produced its billionth barrel as long ago as September 1954, Aramco already is injecting the high-pressure gas associated with oil production into the top of the Abqaiq structure. The average daily rate during the first six months of the year was in the neighborhood of 150 million standard cubic feet per day. The Abqaiq gas-injection plant has been in operation since March 25, 1954.

**Refining:** During the first half of 1957, Aramco's refinery at Ras Tanura processed an average of 197,196 b/d, almost identical to 1956, when the 12-month average was 198,532 b/d. The refinery began processing the heavier crude now being produced from the offshore Safaniya field, as well as the crudes from Aramco's other fields.

The largest addition to Aramco's facilities has been a $6 million diesel desulfurization unit which went onstream, July 9. This catalytic desulfurizer was designed to process 15,000 b/d of diesel blending stock and to reduce the sulfur content from between 0.6 and 1.4% by weight to a maximum 0.1%. The catalytic desulfurizer functions by converting sulfur in the feed stocks to hydrogen-sulfide gas, through the use of hydrogen gas from Ras Tanura's fluid Hydroformer.

## SAUDI ARABIAN OIL FIELDS AND PIPELINES




## OIL LAWS

The government signed a concession over its undivided one-half interest in the Kuwait-Saudi Arab Neutral Zone. The terms of the concession are given in the accompanying summary.

### SAUDI ARABIAN—JAPANESE CONCESSION AGREEMENT*

A concession contract covering Saudi Arabia's one-half interest in the offshore areas of the Kuwait-Saudi Arab Neutral Zone was signed on or about December 9, 1957, by the Saudi Arabian government (referred to in this text as the government) with the Japanese Petroleum Export Co. (referred to in this text as the company). The summary which follows is translated from the Arabic text preliminary to signature.

*Duration:* Exploratory phase is two years. This may be extended two years when the government is satisfied the extension is "justified" and the company has met drilling obligations specified later in this summary. If no commercial discovery has been reported by the company within four years, the government may request the company to stop operations. If commercial discovery is made before expiration, the government agrees to grant a concession over the same area for 40 years. Commercial discovery is defined as 1,500 b/d production for 30 days. No extension is specified. However, on expiration of the 40-year period, the government may decide to grant extension over the area, and will then give the company priority on same over other applicants, provided the company matches their offers, unless the other applicants are of Saudi nationality.

*Area:* Covers the offshore area of the Neutral Zone to which the government has rights, from a line beginning six sea-miles from mean low water mark as far out as "the median line between Iran and the Neutral Zone." This includes all islands and their adjacent waters. Twenty years after commercial discovery, and at the end of each subsequent five-year period thereafter, the company must surrender 20% of its concession area on which oil has not been discovered.

*Drilling Obligation:* In order to obtain extension of the initial exploratory period, the company must have three rotary rigs in continuous operation, and must have drilled "to a depth of 10,000 ft." (The contract does not state if this is one well or cumulative footage of several.)

*Annual Rent:* $1.5 million is payable yearly, until discovery of oil and granting of exploitation concession. Payment is deductible from income tax. On commercial discovery, company must pay $1 million yearly for each year elapsed between ratification of contract and commercial discovery. These payments are not deductible from income tax.

*Royalty:* 20% crude oil or asphalt produced annually. Payable in kind or cash at government election. Royalty on natural gas sold or used as fuel, 20%. Royalty if gas is used for natural-gasoline extraction is subject to negotiation. Minimum royalty from crude, asphalt, and gas is $2.5 million annually. Royalty not payable on products used in operations. If royalty is paid in cash, value will be calculated on "posted price."

*Income Tax:* Tax established by Royal Decree 17-2, amended Oct. 16, 1956, applies to all operations of the company, including sale of oil, transportation, refining and marketing. The tax rate is not subject to change insofar as the company is concerned.

*Supplementary Income Tax:* If surplus remains after payment of tax and royalties, supplementary tax is levied to bring government share to 56% of company net profits. No deductions are allowed for taxes paid to foreign governments.

In calculation of the Income Tax and Supplementary Tax, gross income of the company is established as income from all sources including sale of crude oil, refining, marketing, and transportation from which are deducted all deductions allowed by the Income Tax law; all taxes and expenses incurred in the country; "ordinary and reasonable" capital charges; and a reasonable sum for amortization as accepted in Japan or allowed in *Publication F* of the U.S. Tax Code, whichever gives maximum return to the government. The result is net operational income, which "equals the total taxable income less all taxes paid to the Saudi Government and municipalities (including royalties and annual rentals.)"

Among the deductions not allowed are: (1) "benefits mentioned and capitalized expenditures"; (2) annual rental, expenditure before discovery, and payments due on discovery. Following may not be capitalized: (1) "direct cost of exploration and topographical studies, etc."; (2) "reasonable proportion of indirect cost of oil fields"; and (3) "All other costs due to investment of capital in a permanent manner."

*Import Exemption:* Company exempted from import duties on materials used in operations. Does not include imports of personal effects by company personnel.

*Pricing:* Selling price of crude or products will be "best price available in a free market," posted and announced by the company. No discounts will be allowed without government permission.

*Government Oil Purchase:* Government has right to purchase up to 10% of company production of oil, gas, or products at 5% discount. Such purchases are for government use only, and not for resale or export. Government has right to purchase on same basis as other buyers up to 10% of oil produced and retained by company in country for use of friendly Arab countries.

Company gives priority of purchase of products to Saudi or other Arabs on same sale terms as given to general buyers.

*Currency Stipulations:* All payments by the company must be in U.S. dollars or other currency stipulated by the government.

*Refining Obligation:* Company must begin construction of a refinery when production reaches 30,000 b/d over 90-day period. When production reaches 75,000 b/d, company must build as soon as possible one or more refineries with minimum production of 30% company requirements. Such refineries must produce "all possible products of nigh value, including lubricating oils and asphalt." Company must also construct one or more petrochemical plants supplied by natural gas produced by company.

*Stock Participation:* On commercial production, 10% of stock in any company to which concession has been transferred must be offered at par for 30 days to government or private Saudi citizens.

*Directors:* Government has right to nominate two members of board of directors of company to which the concession has been transferred.

*Transfer:* Company may transfer concession within one year of date of contract to another company if company does not contain stockholders objectionable to the government.

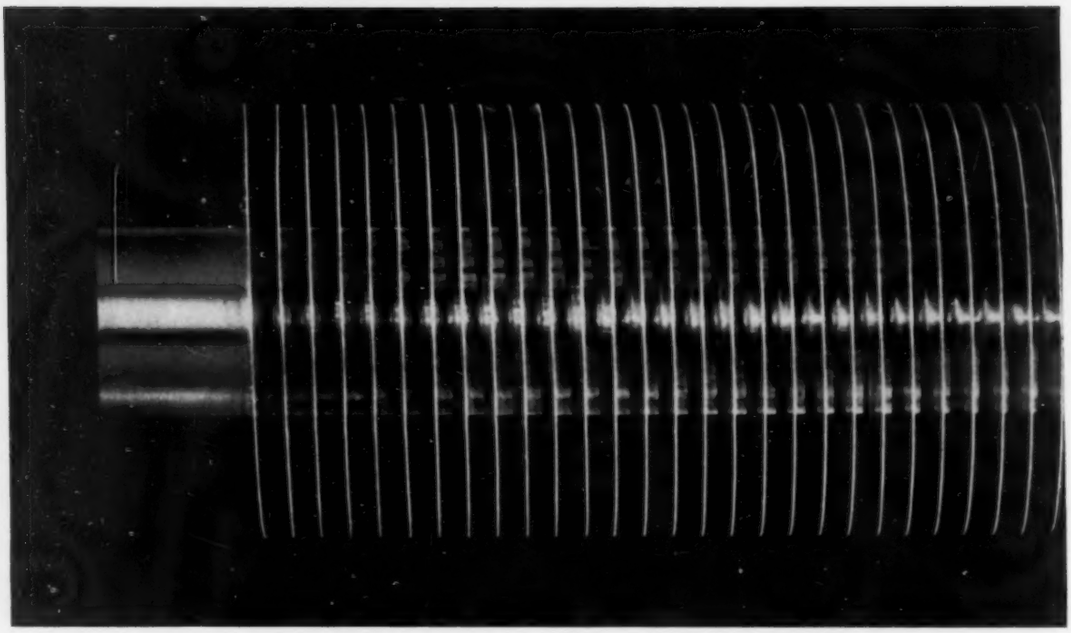
*Reports:* Company must submit report on work every three months. Must report commercial discovery, or government may stop work. Must provide government with information about operations and results of studies within reasonable period, not over six months. Government has access to company's technical records. Company must provide economic studies on operations and world markets, especially as they affect company operations. Must provide reports on taxes, and on number and nationality of employees.

*Source: World Petroleum Legislation, 604 Fifth Ave., New York 20, N. Y. (see p's 37-38)

## NATIONAL FACTORS

The principal factor affecting investment favorability in the country is the government's continued pressure for changes in the concession contract with Aramco. The basic change wanted is conversion of the company's now-famous 50-50 profits split to include other activities than production, and to extend through all other industry phases. Specifically, the government wants Aramco to post its own prices for crude and products and make sales directly, rather than delivering to its four parent companies, Jersey Standard, California Standard, Socony, and Texaco. The company has resisted the change—which would tend to place Aramco in direct competition with its owners, especially if worldwide marketing facilities had to be set up.

The recent Japanese-Saudi Arab concession for the Neutral Zone offshore area is a good indicator of the government's demands. It reportedly contains all the government wanted from Aramco. END



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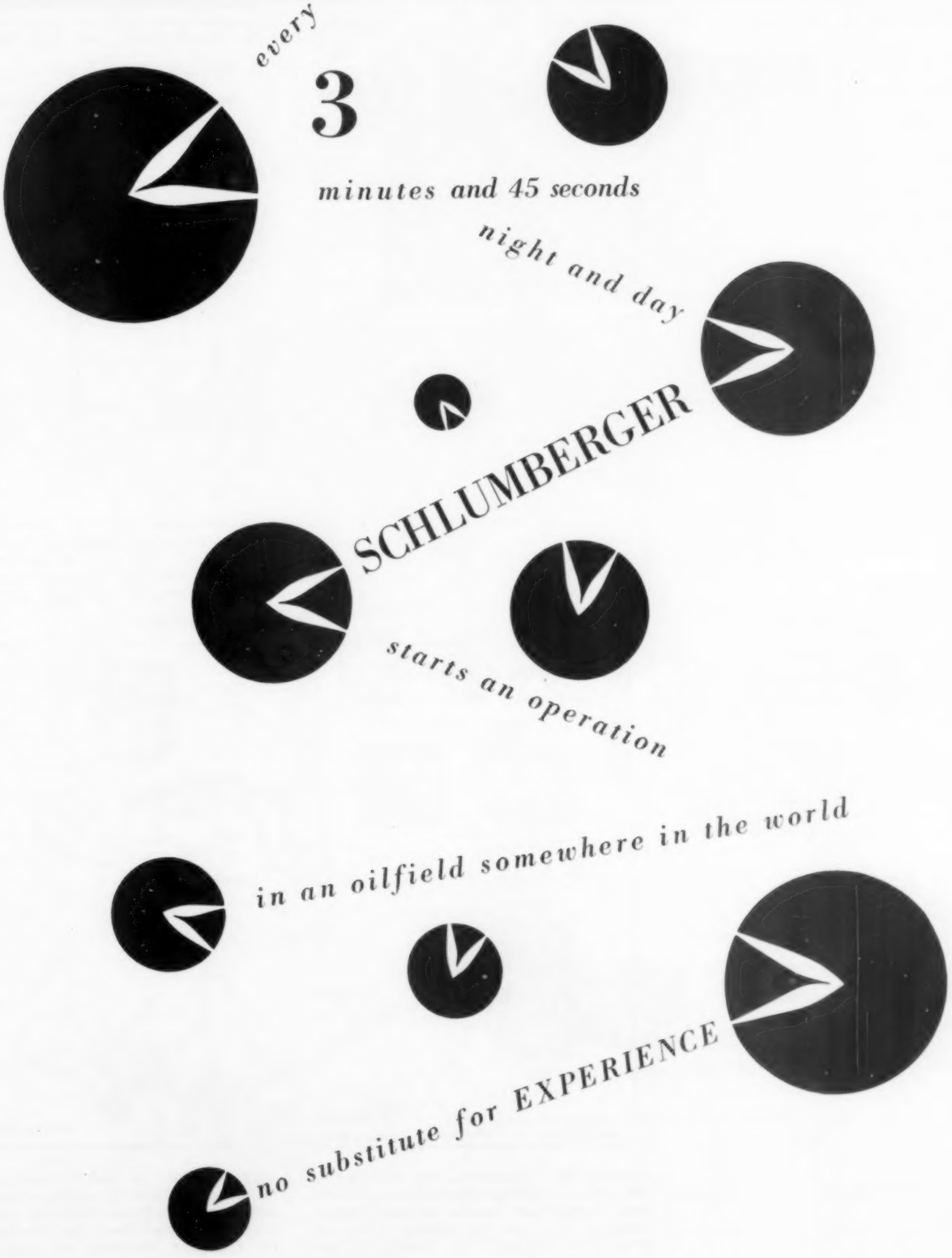
# EUROPE

AUSTRIA
FRANCE
GERMANY
ITALY—SICILY
PORTUGAL
RUSSIA & SATELLITES
SPAIN
SWITZERLAND
UNITED KINGDOM

# EUROPE

## PHYSICAL DEVELOPMENT

**Exploration:** 1957 was marked by considerable increases in exploration throughout Europe, but no sizable discoveries. Developments in the major countries are covered in separate reviews. In **Belgium,** no exploration was known to have been performed in 1957; however, a new company for oil exploration was formed, Ste. Belge de Réchèrches et d'Exploitation Pétrolières (Pétrobèlge).

In **Denmark,** Jersey Standard has purchased Gulf Oil Corp.'s company, DAPCO, and has two seismic crews working. Gulf drilled six dry holes in Denmark before giving up the concession. DAPCO began drilling for oil in December 1957 in Jutland, under contract with Kellogg Overseas Drilling Co. of California. Esso's budget for oil exploration this year is ten million kroner, and the same amount for next year. Company considers the two best possibilities are at Harup in Thy and at Vem, two villages in the Northwest—one on each side of Nissum Bredning.

In **Greece,** two wells were drilled—both dry. Deilmann Bergbau GmbH, a German independent company, drilled a well, Edros 1, two miles southeast of Ardanion No. 1—without success. On the island of Dante, two American companies, Israel Mediterranean Petroleum Inc. and Pan-Israel Oil Co. Inc., acquired a 120,000-acre concession. No oil was found, and the companies gave up the concession after drilling a total of 7,000 ft.

No exploration was performed in Eire **(Ireland), Finland, Norway,** or **Sweden** during 1957.

In **Switzerland,** legal difficulties continued to impede exploration. The most active company was SEAG, registered during November 1956 for oil and gas exploration. The German company of Elwerath is doing exploration, and reportedly surface work was begun in the vicinity of Lake Zurich. $300,000 was budgeted in mid-1957 for seismic work. A number of the major companies are known to be interested in the area, but the requirement of 75% Swiss capital has discouraged operation.

**Production:** Crude production expanded by about 18.2% during 1957, due mostly to increases in The Netherlands and in Italy. Some slight increases were shown in France, and in Germany. Production during 1958 is expected to rise about 10%. No sharp increases are foreseen for any of the countries now producing.

**Refining:** Consumption in western Europe is again outrunning refining capacity, and another boom in refinery construction is under way. In addition to the new plants which are to be built in major countries, as listed in separate reviews, construction is planned in **Belgium** where a Badger subsidiary has started a $6 million refinery for Esso Standard Refinery SA, for 1958 completion. Facilities include a 5,600 b/d Powerformer and a 5,900 b/d Hydrofiner.

In **Greece** a 30,000 b/d refinery has been constructed at Apropyrgos, near Athens. It is not yet in operation, and bids are being invited. This is probably the first time a major refinery has been built without knowing who the operator was to be. Late in 1957, Elbyn, a Greek corporation, was reportedly to operate the plant, with crude to be supplied by Esso. However, government permission was not forthcoming, and at year's end the plant was reported still open for bids.

In **Ireland,** construction of a $27.5 million oil refinery at Whitegate, Cork Harbor, began in September. Irish Refining Co. Ltd. owns the plant, and the board of directors consists of members of Esso Petroleum Co., Shell-Mex and BP, and California and Texas Corp.—with capital investments of 40%, 40%, and 20%, respectively. Construction contracts have been entered into with Lummus Co., London, a subsidiary of The Lummus Co., New York, for the refining units. Subcontracts have been let with Tank Erectors Ltd., London, formerly Chicago Bridge & Iron Ltd., for storage tanks, and with George Wimpey & Co., London, for marine facilities.

In **Finland,** the first refinery is now onstream. Half of the 17,000 b/d plant's crude supply will come from the Middle East by Western oil companies, the other half from Russian sources. Plant is behaving very well and producing over its rated capacity. It was built by Lummus Co. for Neste Oy, a government company.

In **Norway,** the government has finally agreed to the building of a refinery by Jersey Standard near Sarpsborg on the east bank of Oslo Fjord. Capacity will be 40,000 b/d.

In **Switzerland,** the Ste. Financière Italo-Swiss plans an oil refinery near Stadio, Tessin canton. Investment of 60 million Swiss francs is planned. One Swiss franc is equal to 23.36 cents. Capacity of the plant has not been given.

**Transportation:** A trans-Europe pipeline is being contemplated by a group of companies, including Royal Dutch-Shell and others. Participants include Caltex, Esso Standard, Mobil Oil Française, Petrofina, and some German companies. The line would begin at Marseilles and terminate at Rotterdam. Distance would be about 700 miles, and line would run through eastern France, Luxembourg, West Germany,

**EUROPE—CRUDE-OIL PRODUCTION AND RESERVES**

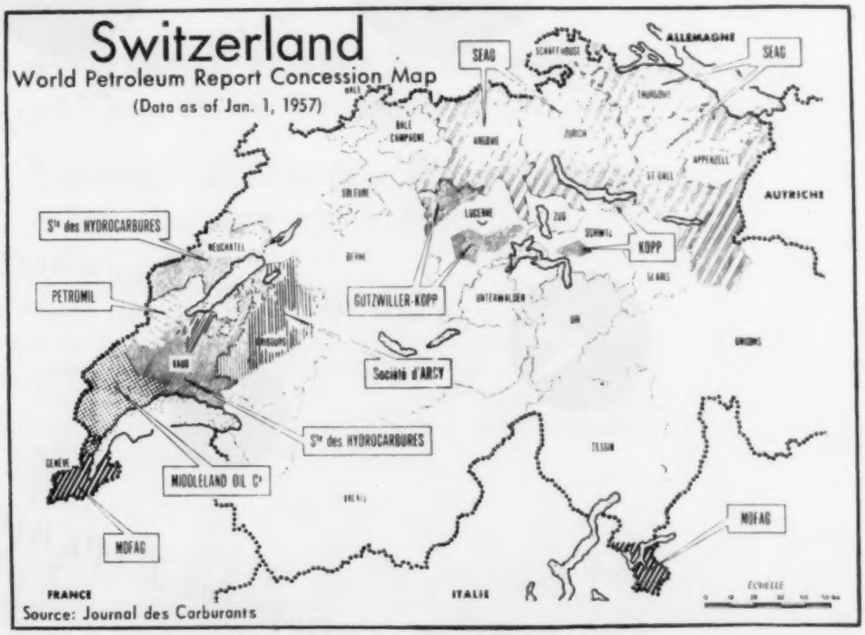
| | Production 1957 (Barrels Per Day) | Reserves (a) (Millions of Barrels) |
|---|---|---|
| Albania | 10,000 | 20 |
| Austria | 60,100 | 395 |
| Czechoslovakia | 3,900 | 15 |
| France | 28,000 | 150 |
| Germany (West) | 76,700 | 365 |
| Hungary | 14,300 | 150 |
| Italy (including Sicily) | 27,600 | 200 |
| Netherlands | 29,100 | 115 |
| Poland | 3,700 | 20 |
| Romania | 219,200 | 800 |
| United Kingdom | 1,700 | 7 |
| USSR | 1,974,900 | 23,000 |
| Yugoslavia | 8,400 | 32 |
| Totals | 2,457,600 | 25,269 |

a Estimated for each country as of the latest data available.

**EUROPE—ESTIMATED CONSUMPTION OF PETROLEUM PRODUCTS**

(Crude-Equivalent Basis—Thousands of Barrels Per Day)

| Country | 1957 | % Change 1957 Over 1956 |
|---|---|---|
| Austria | 43 | + 7.3 |
| Belgium and Luxembourg | 134 | +11.6 |
| Denmark | 90 | +13.9 |
| Eire (Ireland) | 29 | + 3.6 |
| Finland | 37 | +12.1 |
| France | 434 | — 1.1 |
| Germany (West) | 392 | +23.3 |
| Greece | 35 | + 6.1 |
| Italy | 310 | + 9.5 |
| Netherlands | 188 | + 8.7 |
| Norway | 66 | + 8.2 |
| Portugal and Islands | 32 | + 6.7 |
| Spain | 78 | + 6.8 |
| Sweden | 206 | +10.2 |
| Switzerland | 62 | +14.8 |
| United Kingdom | 659 | + 3.6 |
| USSR and Satellites | 2,055 | +15.5 |
| Yugoslavia | 20 | +11.0 |
| Others | 207 | + 6.7 |
| Total Europe | 5,077 | +10.9 |

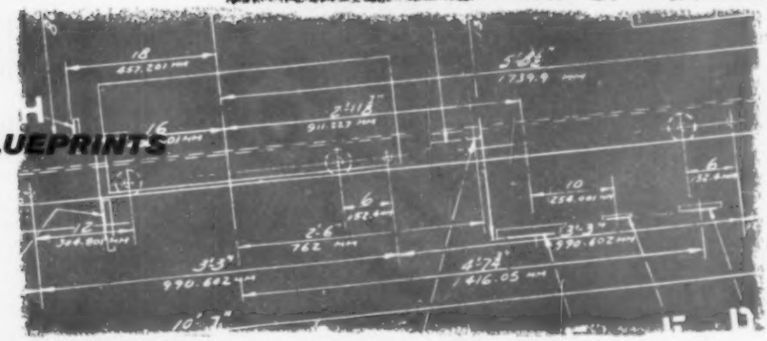


# MEN WITH IMAGINATION

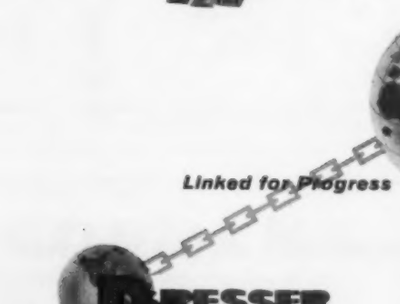
PLAN TOMORROW'S
PROGRESS TODAY

***From IDEAS***

***... to BLUEPRINTS***



***... to PRODUCTS***

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The Netherlands, and Belgium. Cost would be around $280 million. No final decision as yet has been made to build the line; however, it would considerably shorten tanker hauls by enabling tankers to put in at Marseilles and avoid the long trip to refining centers along the English Channel and the Baltic.

**Consumption:** Increase in consumption during 1957 in Western Europe was about 10.9% over 1956—slowed by the Suez crisis. Indications during 1957 point to a slackening in the European rate of consumption growth. A revised OEEC estimate now places Western Europe's need for oil products in 1960 at 1.2 billion barrels, or about 3.29 million b/d—52% more than in 1955. This is still a phenomenal increase, especially when compared with the 0.4% yearly increase which occurred in the same area prior to World War II.

Development of a common market in Europe —which would cover Germany, France, Italy, The Netherlands, Belgium, and Luxembourg—would create (1) a single economic unit for purposes of trading without internal customs duties and with unified tariff rates for all goods entering from outside, and (2) integrated development of atomic energy. This would tend to increase petroleum consumption within this area by stimulating industrial production.

### OIL LAWS

The two major developments in oil laws of Europe during 1957 were: (1) passage of the new Italian law, which became effective in 1957; and (2) the new Spanish oil law which was pending at the end of 1957. There has been a general trend toward liberalization of oil laws throughout Europe to permit participation by foreign companies. The Italian mainland law was an exception to this trend. END

**REFINERIES AND CAPACITY—EUROPE**

| Name of Country | Number of Plants | Crude Capacity (Barrels Daily) | Cracking Capacity (Barrels Daily) |
|---|---|---|---|
| Albania | 3 | 3,400 | — |
| Austria | 9 | 47,410 | 11,000T |
| Belgium | 8 | 152,300 | 30,500TC |
| Bulgaria | 3 | 9,000 | — |
| Czechoslovakia | 4 | 26,000 | — |
| Denmark | 3 | 980 | — |
| East Germany | 2 | 4,800 | — |
| France | 15 | 628,470 | 119,450TC |
| Germany (West) | 29 | 335,010 | 80,300TC |
| Greece | 1 | 27,000 | — |
| Hungary | 4 | 24,000 | — |
| Italy | 35 | 550,500 | 68,320TC |
| Netherlands | 2 | 341,000 | 95,000TC |
| Norway | 1 | 1,800 | — |
| Poland | 7 | 12,000 | — |
| Portugal | 1 | 27,000 | 10,000C |
| Romania | 15 | 157,000 | 69,000TC |
| Spain | 3 | 115,700 | 3,500T |
| Sweden | 4 | 47,900 | 1,000T |
| Switzerland | 2 | 1,850 | — |
| United Kingdom | 16 | 618,150 | 127,300TC |
| USSR | 68 | 1,800,000 | 520,000TC |
| Yugoslavia | 3 | 19,800 | 1,100T |
| Total Europe | 238 | 4,951,070 | 1,136,470 |

Under cracking capacity to indicate type: T—Thermal. C—Catalytic.

## Switzerland

## Oil Law Summary★

*No federal legislation. Different law for each Canton. Only Geneva Canton has specific petroleum law.*

**RECONNAISSANCE:** Permit (Geneva) granted, duration 1 year renewable as desired. No obligations, only application fee of US $12.50.

**EXPLORATION: Duration:** 2 years, 2 extensions (Geneva) possible of 2 years each. **Area:** (Geneva) Maximum 1,235 acres per exploration concession. No limit per concessionaire. **Drilling Obligation:** (Geneva) Must drill 1,148 feet per year in first 2 years, or one well of 3,280 ft. depth during first 2 years. **Personnel:** Must be 75% Swiss. **Tax:** (Geneva) Not specified in law, will be fixed in concession. **Other Cantons:** Terms of exploration concession rarely specified. Duration ranges from 3 months in Vaud, to 6 months in Fribourg, to 1 year in Berne, Valais, and Ticino. Conversion guaranteed in Fribourg, Neuchatel, and Ticino. Not guaranteed in Berne, but indemnity payable if not received. Other details left to negotiation in concession.

**EXPLOITATION:** In Geneva production of 7.5 barrels daily must be obtained; conversion is then guaranteed. In other Switzerland, no details spelled out other than as above. **Area:** 124 acres in Geneva centered around original producing well. No limit per concessionaire. Remaining area exploration concession divided in 2 halves, ½ surrounding exploitation concession, on which new exploration concession is issued with double fee, second half also receives new exploration concession to same concessionaire, duration of 4 years and subject to Canton's right to 50% of production. In remainder of Switzerland, area only specified in Valais, at 1.6 square miles. **Royalty:** 15% in Geneva. Other Switzerland, varies from Berne, 4%; Valais, 3%; Ticino, 4%, plus 2% to holder exploration concession and 1% to discoverer. **Taxes:** In Geneva annual tax of US $50 per well. Other Switzerland, not specified.

★Taken from *World Petroleum Legislation*, 604 Fifth Ave., N. Y. 20, N. Y. (see p's 37-38)

**REFINERIES IN BELGIUM—1957**

| *Name of Company* | *Plant Location* | *Crude Capacity* | *Type Plant* | *Cracking Capacity* |
|---|---|---|---|---|
| "Albatros" S.A. Belge pour le Raffinage de Petrole | Antwerp, Kiel[1] | 14,000 | SC | 4,500C |
| Belgian Shell Co. S.A. | Ghent | 3,000 | SLA | — |
| Compagnie Industrielle "Atlas" S.A. (Esso) | Hoboken-Antwerp | 2,500 | S | — |
| Esso Standard Ref. S.A. | Antwerp[2] | 33,000 | SC | 11,000C |
| Raffineries Belge des Petroles | Antwerp[3] | 16,300 | SC | 4,000T |
| Raffineries et Distilleries Anversoise S.A. "Radain" | Antwerp | 3,500 | S | — |
| Soc. Industrielle Belge des Pet. | Antwerp[4] | 75,000 | SCA | 11,000C |
| Tankage et Transport S.A. | Antwerp[5] | 5,500 | S | — |
| | TOTAL | 152,300 | | 30,500TC |

[1] Catalytic polymerization unit.
[2] 4,000 b/d thermal reforming capacity, 5,000 b/d cat reformer and 6,000 b/d Hydrofiner for completion July 1958.
[3] 2,300 b/d catalytic former and 2,400 b/d thermal reforming capacity. New topping unit and gas oil desulfurization plant under construction. Asphalt facilities of 150,000 tons yearly capacity.
[4] A 10,000 b/d Hydrofiner and 10,000 b/d cat reformer under construction; completion early 1958. Topping unit revamp to increase crude capacity to 90,000 b/d. Present thermal reforming capacity 6,000 b/d.
[5] 750 b/d Platforming capacity.

Capacities are in barrels per day. Key to type of plant: S—skimming; L—lubricating; A—asphalt; C—cracking; Comp.—complete. Under cracking capacity to indicate type: T—thermal; C—catalytic. All data as of December 1, 1957.

**REFINERIES IN DENMARK—1957**

| *Name of Company* | *Plant Location* | *Crude Capacity* | *Type Plant* | *Cracking Capacity* |
|---|---|---|---|---|
| A/S Kalundborg Oileraffinaderi | Kalundborg | 850 | S | — |
| Dansk Mineraloliefabrik | Copenhagen | 60 | SLA | — |
| L. C. Glad & Co. | Copenhagen | 70 | S | — |
| | Total | 980 | | |

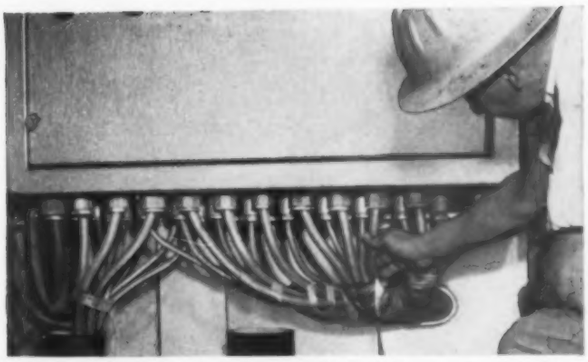
Capacities are in barrels per day. Key to type of plant: S—swimming; L—lubricating; A—asphalt. All data as of December 1, 1957.

**REFINERIES IN SWEDEN—1957**

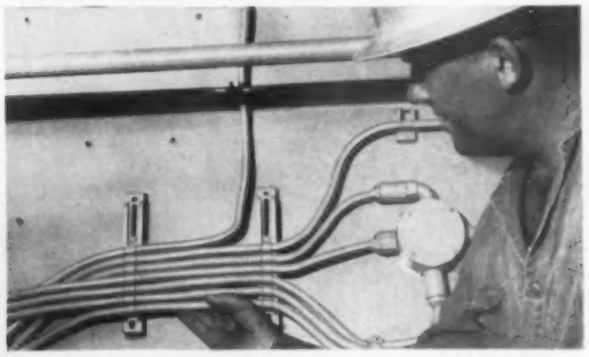
| *Name of Company* | *Plant Location* | *Crude Capacity* | *Type Plant* | *Cracking Capacity* |
|---|---|---|---|---|
| A-B Nymas Petroleum | Nynasham[1] | 14,000 | Comp. | 1,000T |
| | Malmo | 1,900 | SA | — |
| Koppartrans Oljeaktiebolag | Goteborg[2] | 30,000 | S | — |
| Svenska Skifferoje A/B | Narkes-Kvarntorp[3] | 2,000 | S | — |
| | Total | 47,900 | | 1,000T |

[1] 1,900 b/d thermal reforming capacity.
[2] 4,500 b/d thermal reforming capacity and 5,500 catalytic reforming capacity.
[3] Under construction: Ammonia plant, Hydrofiner and Hydroformer for gasolines.
Note: *A-B Nymas Petroleum plans to build a 3,000 b/d refinery at Golhenburg.*
Capacities are in barrels per day. Key to type of plant: S—skimming; A—asphalt; Comp.—complete. Under cracking capacity to indicate type: T—thermal. All data as of December 1, 1957.

ON PHILLIPS PETROLEUM BARGE No. 41 . . .



• Exposure to flexing, oil, grease or sunlight won't cause deterioration of neoprene jacketing on this cable. Resistance to flame and aging are two other advantages of neoprene that mean extra safety, extra-long service.



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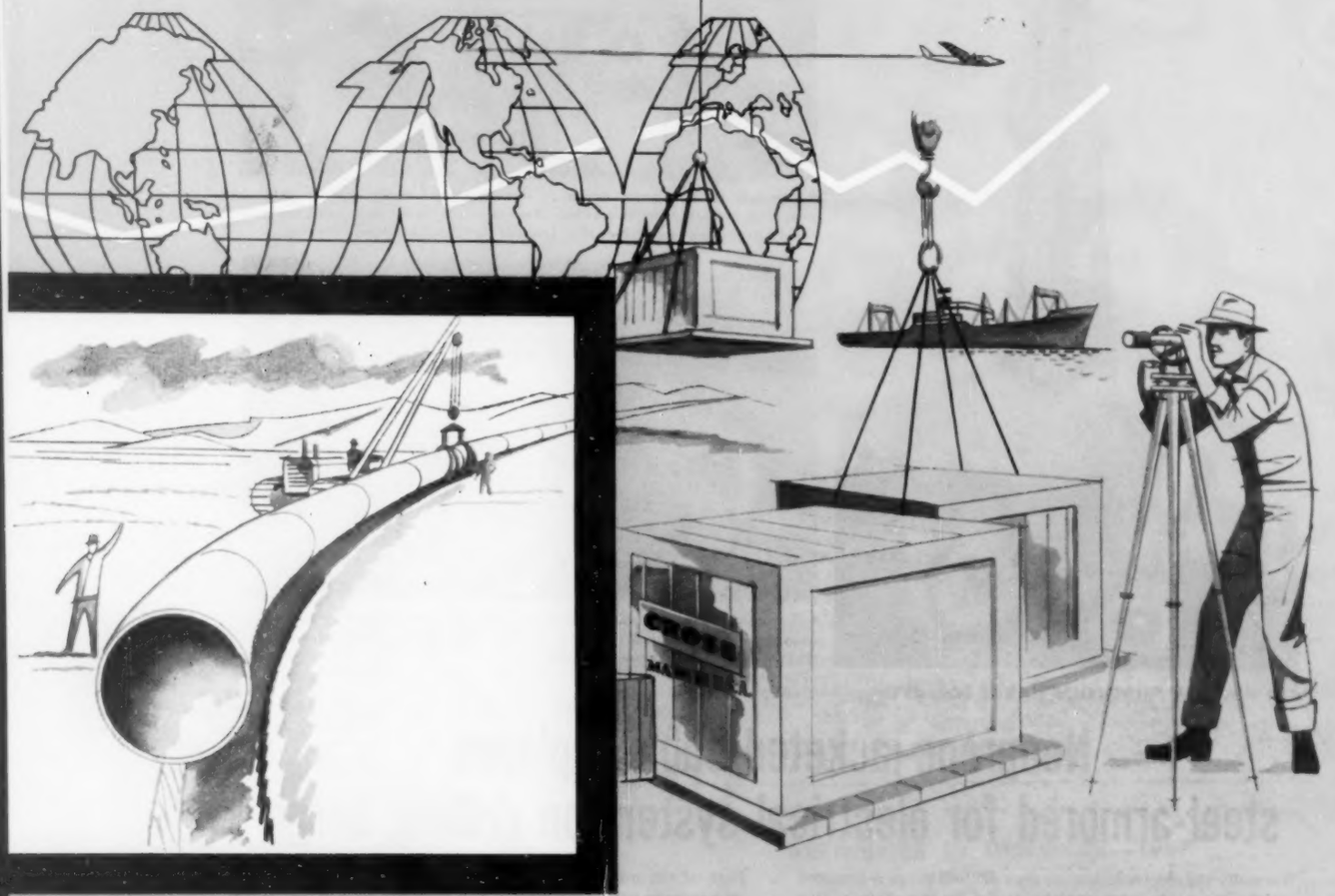


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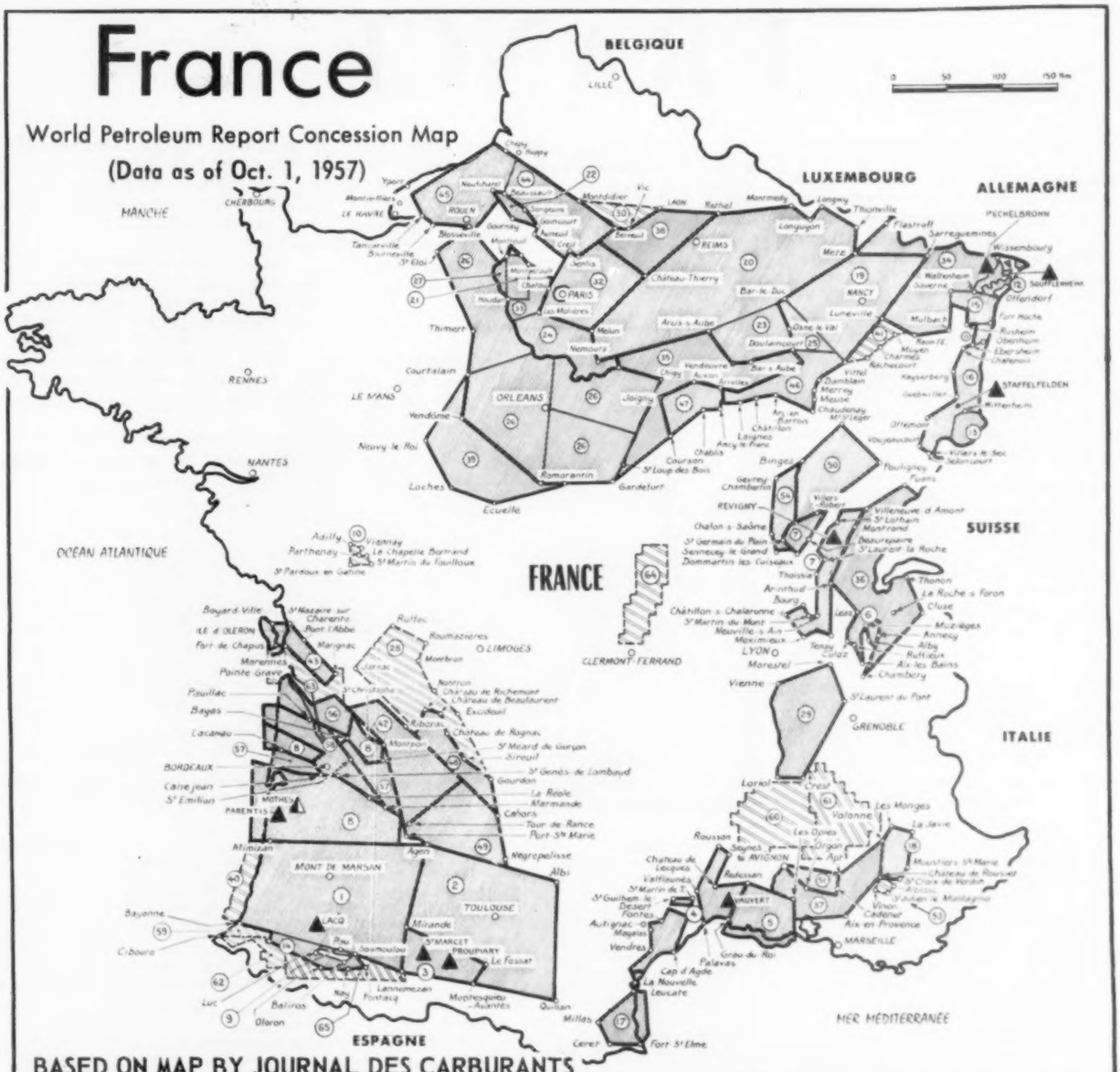
# France

## World Petroleum Report Concession Map

### (Data as of Oct. 1, 1957)




**BASED ON MAP BY JOURNAL DES CARBURANTS**

| COMPANY | EXPLORATION CONCESSIONS GRANTED | EXPLORATION CONCESSIONS REQUESTED | EXPLOITATION CONCESSIONS GRANTED | EXPLOITATION CONCESSIONS REQUESTED |
|---|---|---|---|---|
| S.N.P.A. Sté Nationale des Pétroles d'Aquitaine | 1 9 14 19 25 46 | 40 41 60 65 | LACQ | |
| S.P.G. Société des Pétroles de la Garonne | 2 | | | |
| R.A.P. Régie Autonome des Pétroles | 3 6 7 20 22 23 57 | | ▲▲▲ SAINT MARCET PROUPIARY REVIGNY | |
| C.E.P. Compagnie d'Exploration Pétrolière (ex-S.N.P.L.M.) | 4 5 17 18 21 24 27 33 56 | 63 64 | VAUVERT | |
| ESSO-R.E.P. Esso-Standard S.A.F. | 8 | 30 | PARENTIS | MOTHES |
| PREPA Sté de Prospection et Exploitation Pétrolière en Alsace | 11 12 13 15 16 34 54 36 37 | | ▲▲ STAFFELFELDEN SOUFFLENHEIM | |
| FROPEX France Outremer de Prospections et Exploitations Pétrolières S.A.F. | 26 | | | |
| S.A.P.C.O. S.A. des Pétroles du Centre-Ouest et MOFAG | | 10 28 | | |
| S. P. V. Société des Pétroles de Valence | 29 51 | | | |
| UNIVERSAL NEPTUNE COMPAGNIE | | 62 | | |
| PETROREP | 32 | | | |
| T.P.S.A.F. Transworld Petroleum S.A.F. (ex-S.E.P.) | 14 37 | | | |
| MOBIL-OIL Française et R.E.P.O.A. Recherche et Exploitation de Pétrole et de gaz | 38 58 39 | | | |
| C.F.P.(G) Compagnie Française des Pétroles (Gascogne) | 42 43 | | | |
| C.F.P.(N) Compagnie Française des Pétroles (Normandie) | 44 45 | | | |
| C.P.G. Compagnie des Pétroles de Guyenne | 48 49 | | | |
| S.A.F.R.E.P. S.A. Française de Recherches et d'Exploitations Pétrolières | 47 50 | 59 | | |
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# FRANCE

## PHYSICAL DEVELOPMENT

**Exploration:** No major discoveries were made during 1957. The most notable development was discovery of the first productive sandstone in France—all previous production having been from limestone. The find was near Dax, in southwest France, by Ste. Nationale des Pétroles d'Aquitaine (SNPA), at Clermont 2.

A 75-min drill-stem test of a 105-ft Upper Cretaceous sandstone interval between 6,260 ft and 6,365 ft produced 9 bbl of 35 API gravity crude, 5 bbl of water and a show of gas from the impregnated sandstone. Clermont 1 was bottomed at 11,080 ft as a dry hole after having encountered several noncommercial shows.

Mobil Repga was one of three companies which took up permits on most of the acreage around Bordeaux—given up by Esso—of nearly 2,200,000 acres, or half of Esso's initial concession. Mobil began surface work on its acreage in the spring of 1957. The rest of Esso's former acreage was awarded to two local companies, Cie. d'Exploration Pétrolière (CEP), and Régie Autonome des Pétroles (RAP).

Other companies with acreage in Aquitaine include Cie. Française des Pétroles (Gascogne), Cie. des Pétroles de Guyenne, and Ste. des Pétroles de la Garonne.

In the Aquitaine basin in southwestern France, concessions held by the State-controlled Ste. Nationale des Pétroles d'Aquitaine (SPA) were given up in October. SPA retains only 30% of the concessions, including the Lacq oil- and gas-deposit area. The remainder was shared equally among eight companies—three of them foreign.

**FRANCE—CRUDE PRODUCTION BY COMPANIES**
(Metric Tons)

| | 1957 (1st 10 Months) | 1956 | 1955 |
|---|---|---|---|
| RAP | — | 7 | 196 |
| SNPA | 105,364 | 175,697 | 248,420 |
| Esso-REP | 1,030,453 | 1,033,744 | 576,497 |
| CEP | 314 | 571 | 306 |
| PREPA | 26,946 | 18,765 | 14,538 |
| Pechelbronn | 23,328 | 32,818 | 35,704 |
| Totals | 1,186,405 (28,599 b/d) | 1,261,602 | 875,661 |

**Production:** Oil production in France and the French Union totaled 830,193 tons (about 34,400 b/d) in the first half of 1957. France supplied 724,312 tons. In the same period of 1956, the respective figure was 651,537 tons. The increase was mainly due to expanding Parentis oil output.

**Refining:** By 1961, the Equipment Modernization Plan will have raised refining capacity to about 42 million tons yearly (about 840,000 b/d). Two complete new refineries are planned—one at Strasbourg and the other at Algiers, each of about 20,000 b/d.

A refinery is to be built at Bec d'Ambes by Esso Standard for treating Parentis crude, and will have an initial capacity of 1.6 million tons (32,000 b/d). The onstream date is set for some time in 1959. Capacity may be increased to 2.5 million tons (50,000 b/d) in 1964. In its final form, the refinery will comprise a unit for topping in two stages and a

**FRANCE—CRUDE RUNS TO STILLS**
(Millions of Tons)

| Company | Refinery | 1956 |
|---|---|---|
| CFR | La Mede | 3,949 |
| | Gonfreville | 2,890 |
| Antar PA | Donges | 1,807 |
| | Merkwiller | 181 |
| SF-BP | Lavera | 2,149 |
| | Dunkerque | 1,976 |
| Shell-Berre | Berre | 2,994 |
| | Pauillac | 657 |
| | Petit Couronne | 2,311 |
| Mobil Oil | Frontignan | 975 |
| | Gravenchon | 736 |
| Esso | Port Jerome | 3,328 |
| Caltex | Ambes | 1,032 |
| Totals | | 24,985 |

**FRANCE—EXPLORATION PERMITS IN FORCE 1957**

| Permit Holder | Hectares | Date of Expiration |
|---|---|---|
| **Ste. Nationale des Pétroles d'Aquitaine** (SNPA): | | |
| Departments of Gironde, Landes, Lot and Garonne, Gers, Hte. Pyrénées | 1,509,616 | 10/10/57 |
| Nancy Permit—Meuthe and Moselle, Meuse, Moselle and Vosges | 709,190 | 11/6/59 |
| Neufchateau Permit—Hte. Marne, Meuse, Vosges | 122,571 | 3/22/60 |
| Basses Pyrénées | 11,910 | 3/29/61 |
| **Cie. d'Exploration Pétrolière** (CEP): | | |
| Permit of Nantes-en-Seine and Oise | 95,270 | 4/4/58 |
| Permit of Digne (Lower Alps) | 130,000 | 12/12/58 |
| Permit of Roussillon (Aude and Pyrénées orientales) | 127,000 | 12/12/58 |
| Permit of Bonnières-en-Seine and Oise | 30,800 | 8/25/58 |
| Camargue, Gard, Bouches-du-Rhône Permit and Languedoc, Gard, Herault and Aude Permit | | 5/21/59 6/6/59 |
| Etampes, Seine and Oise, Seine and Marine Permit | 284,600 | 8/25/60 |
| Rambouillet, Seine and Oise Permit | 100,500 | 1/1/60 |
| Estéphe, Gironde and Charente Maritime Permit | 162,620 | 6/6/60 |
| Eploitation de Gallician Permit—Gard | 270 | 2/9/62 |
| **Cie. Pétroles de Guyenne:** | | |
| Périgord, Dordogne and Lot Permit | 220,000 | 10/8/58 |
| Bas Quercy, Dordogne, Lot, Lot and Garonne, Tarn and Garonne | 372,000 | 10/8/60 |
| **Cie. Française Pétroles Gascogne:** | | |
| Rochefort, Charente Maritime Permit | 97,000 | 10/8/58 |
| Bergerac, Dordogne, Lot and Garonne, Charante, Gironde, Charente Maritime Permit | 501,400 | 10/8/58 |
| **PREPA** (Ste. de Prospection et d'Exploitation Pétrolière en Alsace): | | |
| Alkirch, Haut-Rhin Permit | 94,017 | 8/4/58 |
| Strasbourg, Bas Rhin Permit | 78,770 | 8/12/58 |
| Colmar, Haut and Bas Rhin, Doubs and Belfort Territory Permit | 240,410 | 8/4/58 |
| La Côte d'Or Permit—Côte d'Or, Saône and Loire | 124,280 | 10/11/58 |
| Exploitation Staffelfelden dans le Haut-Rhin Permit | 162 | 7/12/58 |
| Lorraine, Meurthe and Moselle, Bas Rhin, Moselle, Vosges Permit | 528,876 | 4/26/60 |
| Erstein Permit—Bas-Rhin | 21,170 | 4/9/61 |
| **PREPA-Transworld:** | | |
| Chablais, Ain and Hte. Savoie Permit | 75,600 | 2/2/59 |
| Hte. Savoie Permit—Ain, Savoie, Hte. Savoie | 125,000 | 2/26/60 |
| Provence Permit—Lower Alps, Bouches de-Rhône, Vaucluse, Gard | 281,700 | 2/3/61 |
| Hte. Jura Permit—Ain, Doubs, Jura | 355,900 | 2/24/62 |
| **Régie Autonome des Pétroles** (RAP): | | |
| Pays de Bray, Oise and Seine Maritime Permit | 32,539 | 8/25/58 |
| Chalons-sur-Marne, Aisne, Ardennes, Aube, Marne, Meurthe and Moselle, Seine and Marne, Yonne Permit | 1,930,800 | 7/13/59 |
| Champagne Humide en Marne, Aube, Hte. Marne, Meuse Permit | 290,827 | 7/7/59 |
| Exploitation de Revigny dans le Jura Permit | 7 | 4/8/59 |
| Quadrilatère de Mirande, Lannemezan, Montesquieu, Avantès, le Fossat Mirande Permit | 245,000 | 1/1/60 |
| Hte. Savoie Permit—Ain, Savoie, Hte. Savoie | 51,800 | 3/24/60 |
| Jura Permit—Ain, Saône and Loire, Doubs, Jura | 351,000 | 3/4/60 |
| Entre Deux Mers Permit—Gironde, Dordogne, Lot and Garonne | 168,000 | 3/4/60 |
| **Ste. des Pétroles de la Garonne** (SPG): | | |
| Ariège, Aude, Hte. Garonne, Gers, Lot and Garonne, Tarn, Tarn and Garonne Permit | 1,290,384 | 5/7/58 |
| **Ste. des Pétroles de Valence** (SPV): | | |
| Cavaillon, Bouches-du-Rhône, Vaucluse Permit | 61,800 | 10/9/57 |
| Voiron, Drôme and Isère Permit | 215,000 | 1/6/60 |
| **SAFREP** | | |
| Senonais Permit—Aube, Yonne | 203,000 | 8/19/60 |
| **Cie. Française des Pétroles Normandie** (CFPN): | | |
| Oise Permit—Oise, Seine Maritime, S and O, Somme | 438,000 | 4/14/60 |
| Caux, Eure, Somme, Seine Maritime Permit | 440,000 | 4/14/60 |
| **FROPEX** (France Outre-Mer de Prospection et d'Exploration Pétrolière): | | |
| Evreux, Eure, Seine Maritime, Eure and Loire Permit | 499,900 | 9/1/60 |
| Beaugency, Eure and Loire, Loiret, Loire and Cher Permit | 499,400 | 9/1/60 |
| Sançerre, Cher, Loiret, Loire and Cher, Nièvre, Yonne Permit | 499,700 | 9/1/60 |
| Montargis, Loiret and Yonne Permit | 486,600 | 9/1/60 |
| **REPGA-Mobil Oil:** | | |
| Bordeaux, Gironde, Lot and Garonne Permit | 272,500 | 2/12/60 |
| Aisne Permit—Aisne, Ardennes, Marne, Oise, Seine and Marne Permit | 317,195 | 2/26/61 |
| **PETROREP** (Ste. Pétrolière de Réchèrches dans la Région Parisiènne): | | |
| Aisne, Oise, Seine and Marne, Seine and Oise Permit | 414,172 | 8/11/60 |
| **Esso-REP:** | | |
| Landes Permit—Gironde, Charente Maritime, Dordogne, Lot and Garonne, Landes | 886,493 | 2/20/61 |
| **SIREP:** | | |
| Lower Alps and Var Permit | 10,855 | 11/29/61 |

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reforming catalytic unit with all necessary accessory units. It will have a storage capacity of 400,000 cubic meters.

Underground storage for 1.09 billion cubic feet of gas was completed near Beynes, north of Paris. Gaz de France is the user.

**FRANCE—PRODUCTION AND DRILLING DATA**

| Name of Field | Year Discovered | Depth (Feet) | API Gravity | Production (Barrels Per Day) 1956 | 1955 |
|---|---|---|---|---|---|
| Donau-Schirrhein-Reiningen* | 1954 1955 | 1,650-4,720 | 30.2-39.8 | 114 | 162 |
| Eschau | 1956 | 2,940 | 33.9 | 27 | — |
| Gallician | 1951 | 6,600 | 25.7 | 15 | 7 |
| Haguenau-Scheibenhard | ? | NA | ? | 16 | — |
| Lacq (Upper) | 1949 | 2,200 | 21.8 | 3,265 | 4,573 |
| Lucats | 1956 | NA | ? | 5 | — |
| Lugos | 1956 | NA | ? | 102 | — |
| Mothes | 1955 | 8,150 | 21.0 | 314 | 224 |
| Parentis | 1954 | 7,700-600- | 32.7 | 20,157 | 11,691 |
| Pechelbronn area | 1813 | 4,000 | 27.5 | 641 | 778 |
| Soufflenheim | 1954 | NA | NA | 150 | — |
| Staffelfelden | 1952 | 6,270 | 40.4 | 65 | 123 |
| Average, b/d | | | | 24,871 | 17,558 |

Note: Parentis reserves estimated at about 125 million barrels. NA—Not available.

The first desulfurization unit at Lacq field is now in operation, with a capacity of 22.9 million cubic feet daily. A second plant is being completed.

A project for the construction of a steam cracking unit at its Port-Jérôme refinery in France is being studied by Esso Standard SAF. With a throughput capacity of 230,000 tons a year, the unit would supply a range of gaseous raw materials to synthetic rubber and petrochemical plants under construction or projected in the vicinity.

**FRANCE—GAS PRODUCTION**

| | 1956 | 1955 |
|---|---|---|
| Condensate (St. Marcet) (barrels) | 243,574 | 242,240 |
| Gas (millions of cubic feet): | | |
| St. Marcet | 11,682 | 9,661 |
| Lower Lacq zone | 1,564 | — |
| Total gas | 13,246 | 9,661 |

**Transportation:** A 550-mile gas pipeline is being constructed from Lacq field, in the south, to Paris. Branch lines will connect Lyon and Nantes. The main line will be of 24-in. pipe at the southern end, narrowing to 16-in. pipe the last 250 miles into Paris.

Esso Standard of France has received permission from the Bordeaux port authorities to lay a deep-sea pipeline across the estuary of the Gironde, France, to carry oil from the Parentis field to Esso's new refinery at Ambes, on the north side of the estuary.

**Marketing:** Inland petroleum consumption in the first six months of 1957 totaled 8.1 million metric tons, a decline of nearly 7.5% compared with 1956. Black oils fell by 12% to five million tons. Consumption of motor gasoline was 2.4% lower, at two million tons. In part, these declines reflect the Suez crisis—gasoline rationing continuing until the end of June, while black-oils rationing remained in force until the beginning of October. Gasoline sales have since been affected by the sharp rise in fuel taxes at the end of June—preliminary figures showing that consumption in August and September was respectively 10% and 7% below that in the same months of 1956.

Consumption during 1956 was 19,638,345 metric tons, of which 17,619,496 tons (approximately 352,380 b/d) was interior consumption. The largest increase during the year was shown by aviation gasoline, which increased 26.7% over 1955. Fuel oils increased by 16.7% (to 46.8% of total consumption). LPGas was only 2.6% of the total market, but the increase over 1955 was 24.2%.

### NATIONAL FACTORS

The government's attitude toward foreign private oil investment is favorable, but conditioned on compulsory participation by French companies.

The level of taxation is relatively high, due to an upstream dividend tax of 18%, plus a 38% tax on net profits.

New investments in dollars are subject to authorization, but may be amortized at any time if made after August 31, 1949. Profits are transferrable for about 7% to 14% of capital invested.

## *Petroleum Law Summary*★

**EXPLORATION: Duration:** Explr. "permit," 5 yrs., extendible twice for max. 15 yrs. **Area:** Reduced 50% on 1st extension, 25% on 2d, for final 37.5% of original permit. No max. per concession. **Ownership:** French companies only. Permit granted at govt. discretion—with recent policy to exclude foreigners who "do not offer a substantial participation to French public or private capital." **Transfer:** At govt. discretion. If authorized, new holder must be sold geological and geophysical data. **Fiscal:** Applicant committed to exploration expenditure negotiated between govt. and concessionaire. Min. annual expenditure varies between 35 and 55 US cents per acre; renewals conditioned on min. expenditure. No taxes during exploration. **Drilling Obligation:** Not stated. **Conversion to Exploitation:** Exploitation concession obligatory upon commercial oil discovery, i.e., when cumulative production exceeds 2.1 million barrels.

**EXPLOITATION: Duration:** Max. 50 yrs. **Area:** May not exceed previous explr. permit. Max. number concns. per concessionaire, unlimited. **Ownership:** French companies (see above). **Fiscal:** Expenditures and other obligations negotiated in each case between govt. and concessionaire. **Royalty:** Progressive, 6% on crude production from 1,000-2,000 b/d, to 14% on 20,000 b/d and over. May be modified should new taxes "increase concessionaire's financial charges." On natural gas, royalty is 5% of sales over 300 million cubic feet per year—nothing below that level. Additional royalties of 2¢ per bbl of crude and 0.3¢ per mcf of gas production for French administrative departments. **Income Tax:** Averages 45.6%—with upstream dividend tax of 18% on 75% of income after payment of income tax. US-French convention obviates double taxation.

★Taken from *World Petroleum Legislation*, 604 Fifth Ave., N. Y. 20, N. Y. (see p's 37-38)

## REFINERIES IN FRANCE—1957

| *Name of Company* | *Plant Location* | *Crude Capacity* | *Type Plant* | *Cracking Capacity* |
|---|---|---|---|---|
| Compagnie Francaise de Raffiinage | La Mede [1] | 130,000 | SAC | 14,000TC |
| | Gonfreville [2] | 70,000 | Comp. | 28,500TC |
| Compagnie de Raffinage Shell-Berre | Petit-Couronne [3] | 50,000 | Comp. | 12,500C |
| | Pauillac | 16,500 | SA | — |
| | Berre [4] | 75,000 | Comp. | 14,700TC |
| Pechelbronn SAEM | Merkmiller | 4,200 | SAL | — |
| Raffineries Francaises de Petrole de L'Atlantique | Donges [5] | 34,000 | Comp. | 20,400C |
| Caltex SAF | Bec d'Ames [6] | 22,000 | SC | 4,800C |
| Ste. Cherifienne des Petroles | Petitjean (Morocco) | 4,000 | SC | 2,650C |
| Ste. Francaise des Petroles B.P. | L'Avera [7] | 45,000 | S | — |
| | Dunkerque [8] | 47,000 | Comp. | — |
| Mobil Oil Francaise | N. Dame de Gravenchon [9] | 17,000 | SC | 10,900C |
| | Frontignan [10] | 28,000 | Comp. | 11,100C |
| Esso Standard Societe Anonyme Francaise | Port Jerome [11] | 85,000 | L | — |
| | La Mailleraye [12] | 770 | | |
| | Total | 628,470 | | 119,450TC |

[1] 18,000 b/d thermal reforming capacity, 2,000 b/d thermal cracking capacity and 12,000 b/d catalytic cracking capacity.
[2] 13,000 b/d thermal reforming capacity, 9,000 b/d thermal cracking capacity and 30,000 b/d catalytic cracking capacity.
[3] New distillation unit of 80,000 b/d projected for completion 3rd quarter 1958. Catalytic reformer 13,000 b/d projected for completion 1st quarter 1959.
[4] 11,000 b/d cat cracking, 4,700 b/d thermal capacity.
[5] 4,000 b/d thermal reforming capacity. Under construction: 11,000 b/d Houdriformer.
[6] Under construction: Vacuum unit, FCCU and poly plant; complete 1957. Thermal Reforming capacity 3,900.
[7] 5,500 b/d thermal reforming capacity. Under construction: 50,000 b/d topping plant, complete end 1957.
[8] 7,300 b/d thermal reforming capacity, 10,000 b/d cat. reformer under construction, completion mid 1958.
[9] 2,500 b/d thermal reforming capacity and 3,500 b/d catalytic reforming capacity.
[10] 2,500 b/d thermal reforming capacity.
[11] 12,000 b/d thermal reforming capacity. Under construction: 10,000 b/d catalytic cracker; complete 1957.
[12] Medicinal and technical white oil greases and special products.

Capacities are in barrels per day. Key to type of plant: S—skimming; L—lubricating; A—asphalt; C—cracking; Comp.—complete. Under cracking capacity to indicate type: T—thermal; C—catalytic. All data as of December 1, 1957.

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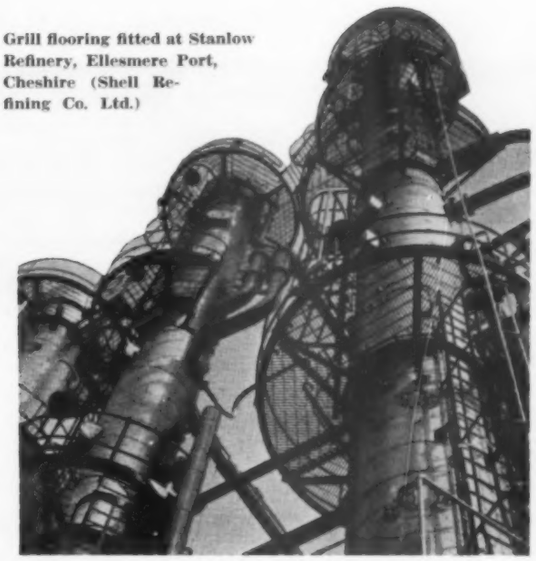

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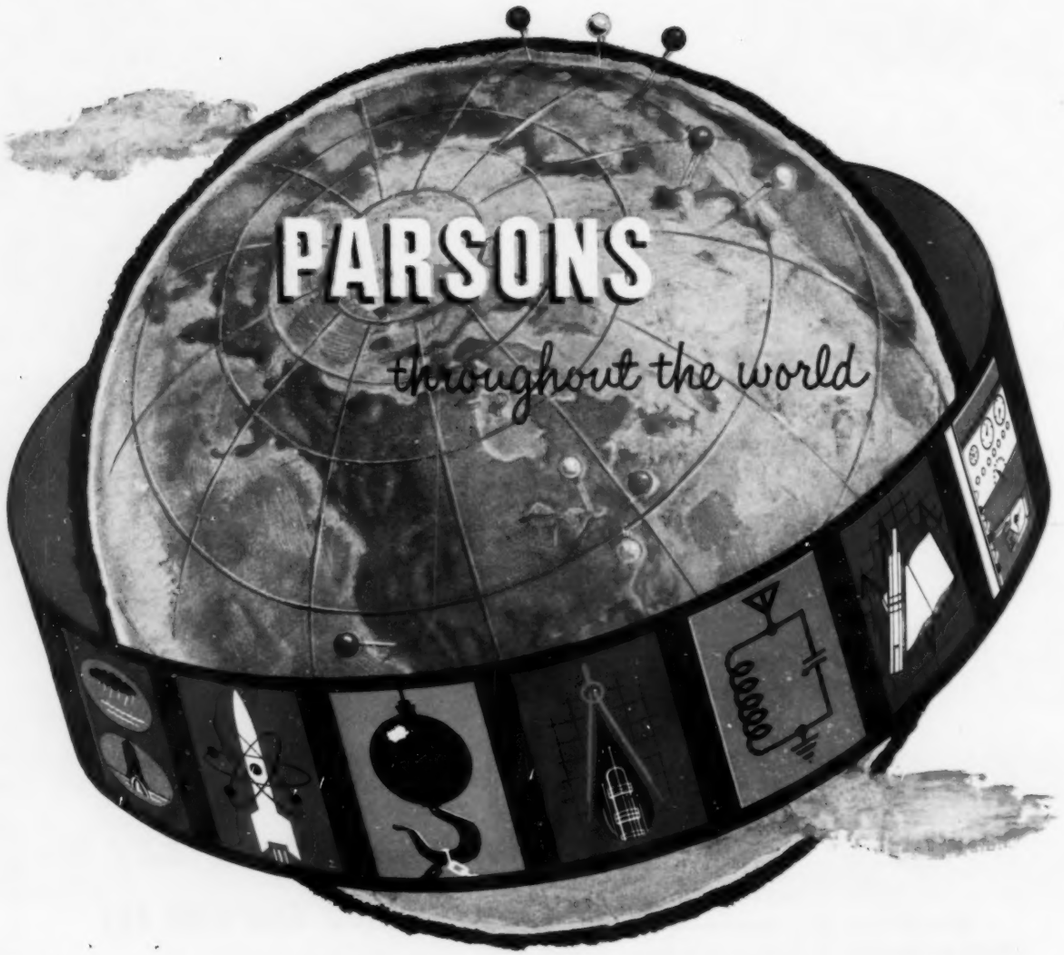


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# GERMANY

## PHYSICAL DEVELOPMENT

**Exploration:** The future of the German oil industry, which has only existed to date through protection behind a high tariff wall, is not promising. Exploration has consistently added to reserves but at a steadily decreasing rate.

**Annual Production Increase**
Increase over previous year (in %)

| 1950 | 1951 | 1952 | 1953 | 1954 | 1955 | 1956 |
|---|---|---|---|---|---|---|
| 33.0 | 22.0 | 28.5 | 24.7 | 21.8 | 18.0 | 11.4 |

In 1957 the increase is likely to be just slightly above that of 1956, while for 1958 it will amount to less than 8%, according to predictions, and after that it will come to an almost complete standstill, with new discoveries just replacing shut-down wells.

No major discoveries were made during 1957, but eight new oil fields (compared with 11 during 1956) and four gas fields—all minor—were found. Depth of wells increased, with attempts to explore the deep Zechstein. Two wildcats, Eldingen Z 1 (Hanover) by Gewerkschaft Elwerath was abandoned at 13,258 ft. in August, and Cismar 3 by Gewerkschaft Brigitta was still drilling at below 14,800 ft. at year's end.

Warnau 2a by joint Deutsche Erdoel-Gewerkschaft Elwerath found oil some miles north of the Ploen-Boostedt field, at 8,200 ft. in the Dogger beta, and produced about 33 b/d during the latter half 1957.

Curslack 3, southeast of Reitbrook field (near Hamburg), came in on the deep flank of the Reitbrook structure. Hardesse 4, between Niehagen and Gifhorn fields, came in at below 6,000 ft. with about 38 b/d during 1957. Other finds in Hanover were made at Blumenhagen and at Wense near Meerdorf field; also in Meckelfeld-Sued 1 well by Wintershall-Gewerkschaft Elwerath joint interests, which is a notable extension of the old Meckelfeld field.

Four new fields were found by the Gewerkschaft Brigitta and Mobil Oil AG group in the oil territory between Weser and Ems rivers. Welpe 1 found oil in the Middle Kimmeridge at about 6,300 ft.; and a second well, one mile east, found the same pay at 5,300 ft. This find produced 85 b/d during 1957, highest production of any new field. Hagen 1, in Vechta district, found oil at 6,100 ft. during September. Molbergen-West 1, 2.5 miles west of the old Molbergen field, found 66 b/d in September. Varel 4 find was especially important. It is some miles south of the Jade belt, near Wilhelmshaven, and found Elsfleth sandstone below the Hauterive transgression at 5,071 ft. to 5,136 ft., producing about 180 b/d on 1/8-in. choke. Still another find was at Wehrbleck 1, about halfway between Barenburg and Dueste-Wietingsmoor fields, which yielded around 3 bbl. per hour from 3,369 ft. to 3,382 ft.

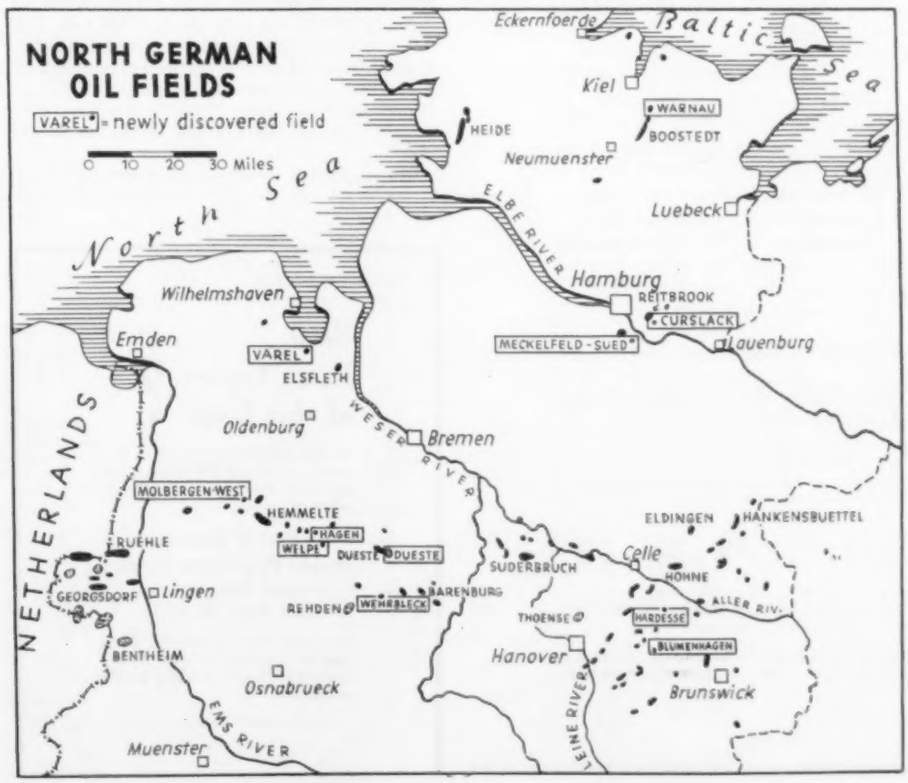
A four-company group found 70 b/d oil at Hayna 1, upper Rhine Valley, near Germersheim, at about 4,500 ft., Upper Pechelbronn formation. Another well, Leopoldshafen 1a, 5 miles north of Karlsruhe town, found about 63 b/d on 1/8-in. choke at 4,051 ft. to 4,061 ft. in Meletta pay. A second well nearby found production in the upper Cyrene marl (Tertiary) at 3,067 ft. to 3,100 ft.

Promising gas finds were made during the year, including three in eastern Bavaria, and one by Wintershall in June at Dueste-Zechstein 1 at 10,325 ft.

**Production:** German oil production began in 1858 when near the German village of Wietze, located on the Aller river in the big north German sedimentary basin. The first commercially exploited field was Pechelbronn in Alsace. Virtually all the fields discovered in those very early days of German oil production are still commercial producers. After 1933 the government took a direct interest in making Germany less dependent on imported commodities of any kind, and exploration activities and new field discoveries immediately begin to soar upwards.

The combination of these decrees—which are all still valid today (except for the drilling loan program)—brought about the successes of the following years. They made possible the almost complete geophysical survey of northwest Germany which added 180 new saltdomes to the 50 already known and they stimulated an increase of total drilling from 74,000 meters in 1933 to nearly 153,000 in 1935 and 300,000 in the last full war year. A large part of this was financed by the above named government drilling loans which paid for some two-thirds of all exploratory drillings from 1934 to 1945.

The major importance of all these activities was that it resulted (1) in the discoveries of oil not only on the side of saltdomes, as heretofore, but also above them and (2) in the location of oil deposits which had nothing to do with saltdomes. The first of these developments led to the discoveries of such important fields as Reitbrook and Heide, both located north of the Elbe river where (except for a very insignificant output at Heide) no oil had ever been produced. The second development brought the discoveries of the fields west of the Ems river which have since become the country's largest ones in both production and reserves. It also led to the discovery of the




### WEST GERMANY—WELL DATA

| | 1957 (1st Half) | 1956 | 1955 |
|---|---|---|---|
| Exploratory (wildcat) wells drilled: | | 113 | 107 |
| Oil producers | | 11 | |
| Gas producers | | 6 | |
| Dry | | 96 | |
| Development (plus extension) wells drilled: | | 403* | 460 |
| Oil producers | | NA | |
| Gas producers | | NA | |
| Dry | | 76 | |
| Total wells drilled | | 516 | 567 |
| Footage drilled: | 1,228,582 | 2,321,971 | 2,409,140 |
| Exploratory (wildcat) | 265,837 | | |
| Development (including extension, production, service footage) | 962,745*** | | |
| Total expl. and develop. | 1,228,582 | 2,321,971 | 2,409,140 |
| Drilling rigs in service (end of year): | | 106** | |
| Exploratory | | NA | |
| Development | | NA | |
| Total | | | |
| Total wells drilled (cumulative) | | | |
| Total oil producers end of year | | 3,010 | |
| Total gas producers end of year | | 40 | |
| Total wells pumping end of year | | 2,586 | |
| Total wells flowing end of year | | 424 | |
| Total dry wells end of year | | NA | |

*Of the 403 total, 327 were producing—not broken down as to oil and gas.
**Estimated.
***270,652 extension-well footage, 662,611 production, and 29,482 service.

## REFINERIES IN GERMANY—1957

| *Name of Company* | *Plant Location* | *Crude Capacity* | *Type Plant* | *Cracking Capacity* |
|---|---|---|---|---|
| Badische Anilin- und Soda-Fabrik AG. | Ludwigshafen-on-Rhine | 1,000 | SL | — |
| BP Benzin- und Petroleum-GmbH. (British Petroleum Co. Ltd.) | Hamburg-Finken-werder[1] | 32,000 | SCA | 4,500T |
| Deutsche Erdoel-AG. | Heide[14] | 18,000 | Comp. | 8,000C |
| | Wietze | 1,000 | SLA | — |
| | Hamburg-Grasbrook[2] | 1,600 | L | — |
| Deutsche Shell AG. | Hamburg-Harburg[3] | 19,000 | Comp. | — |
| | Monheim/Reisholz | 4,700 | SCAL | — |
| | Hamburg-Grasbrook[3] | 640 | L | — |
| Esso AG. | Hamburg-Harburg[4] | 47,000 | Comp. | 10,100C |
| Gelsenberg Benzin AG. | Gelsenkirchen[5] | 67,000 | SCH | 10,000C |
| Gewerkschaft Deurag-Nerag | Misburg nr. Hanover[6] | 16,000 | SCL | 5,000T |
| Gewerkschaft Erdoel-Raffi-nerie Emsland | Lingen in Ems-land[7] | 16,000 | SC | 18,000C |
| Gewerkschaft Grieff Bergbau | Dollbergen | 500 | S | — |
| Johann Haltermann | Hamburg-Wilhelmsburg[2] | 2,000 | | — |
| Kraftstoff-Handelggesell-schaft GmbH. | Essen | 1,700 | S | — |
| Mineraloel- und Asphalt-werke AG. (MAWAG) | Ostermoor on Kiel Canal | 3,000 | SA | — |
| Mineraloelwerke Albert Sengewald | Dedenhausen (Hanover)[8] | 900 | S | — |
| Mineraloelwerke Peine (Schindler) | Peine (Hanover) | 400 | S | — |
| Mobil Oil AG. | Bremen-Oslebshausen[9] | 16,000 | Comp. | 7,700C |
| Oelwerke Julius Schindler GmbH. | Hamburg-Neuhof | 4,000 | SLA | — |
| Ruhrbau Mineraloelraffi-nerie GmbH. | Muelheim on Ruhr[8] | 6,500 | S | — |
| Ruhrchemie AG. | Oberhaussen-Holten[10] | 7,500 | SC | 3,500TC |
| Ruhroel GmbH. | Bottrop[11] | 2,600 | S | — |
| Scholven-Chemie AG. | Gelsenkirchen-Buer[12] | 21,500 | SCH | 5,100C |
| Union Rheinische Braun-kohlen Kraftstoff AG. | Wesseling nr. Cologne[13] | 42,000 | SCH | 11,700T |
| Wintershall AG. | Salzbergen in Emsland | 2,300 | SL | — |
| Zeller & Gmelin | Eislingen in Wurtemberg[8] | 170 | S | — |
| | TOTAL | 335,010 | | 80,300TC |

H—Hydrogenation.

[1] 5,300 b/d Platforming capacity.

[2] Half finished charging capacity.

[3] 2,100 b/d catalytic reforming capacity. A 5,600 b/d gas oil desulfurizer was taken into operation in the beginning of 1957.

[4] 6,500 b/d catalytic reforming capacity. (Esso is building 68,500 b/d refinery at Cologne to include 5,360 b/d steam cracker and 8,100 b/d cyclic powerformer.)

[5] 6,400 b/d catalytic reforming capacity.

[6] 2,500 b/d catalytic reforming capacity.

[7] 3,500 b/d catalytic reforming capacity, crude capacity to be increased to 21,000 b/d.

[8] Plant temporarily closed down.

[9] 3,400 b/d catalytic reforming capacity.

[10] 1,800 b/d catalytic reforming capacity.

[11] 800 b/d thermal reforming capacity.

[12] 2,100 b/d catalytic reforming capacity.

[13] 5,600 b/d catalytic reforming capacity and 4,700 b/d thermal reforming capacity.

[14] Platforming unit planned.

Capacities are in barrels per day. Key to type of plant: S—skimming; L—lubricating; A—asphalt; C—cracking; Comp.—complete. Under cracking capacity to indicate type: T—thermal; C—catalytic. All data as of December 1, 1957.
H—Hydrogenation.

large natural gas field at Bentheim in the same area and of the first commercial discoveries in the upper Rhine valley. The postwar period brought new geophysical methods which helped in locating a connecting chain of oil fields between the "historic" fields around Hannover (the territory between the Aller and the Weser rivers) and the more recent discoveries in the Emsland (west of the Ems river). The fields in this connecting chain (located between the Weser and Ems) are generally not tied to salt-domes. The first major field discovered in this period was Suderbruch (1949), located on a concession held by Gewerkschaft Brigitta, a jointly owned subsidiary of Esso and Shell. This was followed by the discoveries of Eldingen in the same year. Both these fields, which are among Germany's largest, are situated in the Elbe-Weser territory. In the same year two major discoveries were made in the Emsland: Scheerhorn and Ruehlermoor, the last is now Germany's biggest field with an annual output of about 4,800 b/d. Shortly after that oil activities spread to several new areas with the discoveries of Bramstedt, Ploen and Boostedt in Schleswig-Holstein, north of the Elbe river. This area is still not important as an oil producing center but its eight fields are currently supplying a total of about 4,700 b/d. Far more important became the area between the Weser and the Ems which, as was mentioned above, linked the Emsland fields with the old oil fields in the Hannover area. The Weser-Ems area contained only one small field (Etzel) until 1950. Since then 19 new fields have been established with a total production of over 15,000 b/d in 1957. The Weser-Ems area contains also Germany's largest natural gas field, Rehden discovered in 1954. Rehden's current annual production at present is equivalent to about half of Germany's total output from natural gas wells. The next development occurred in the upper Rhine valley where a number of new fields were added to the two small discoveries made in the mid-thirties. However, this area has so far not developed into an important producer, its total output from 11 fields in 1957 being only about 2,300 b/d. Still more recent is the small commercial production in Bavaria which up to 1954 contained only the non-commercial minute field at Tegernsee. Now three fields in the area produce a total of 660 b/d and output is on the rise.

The country's reserves have been growing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every postwar year. In 1947 they were estimated at 10 million tons while ten years later, after 17.8 million tons had been withdrawn, they were estimated at 66.4 million tons.

Predictions for the future indicate that from 1959 on the actual output as well as the total production of the various areas will decline while the output from newly explored areas will grow. The total German output, however, will continue to grow, although only very slightly after 1958. Annual production increases which had characterized the earlier postwar development of the German oil industry are not likely to recur. These increases have already become flattened out in the last few years.

One of the main problems faced by the German crude oil industry is its high production cost. At present the average cost price per barrel is over $5.00 which makes German oil totally non-competitive with most foreign oil. To protect the country's domestic production a very high duty rate on crude oil (approximately $4.40 per barrel) has been in existence since 1951. Under the European Common Market treaty which will go into effect in January 1958, Germany may retain this protective duty for six more years. After that it is scheduled to be abolished. However, the treaty gives Germany the right to institute a State subsidy to protect its crude oil output following the removal of duties. This subsidy may have to be removed after the Common Market treaty has been in existence for 10 years, if a majority of the six member countries so decide.

**WEST GERMANY—REFINERY RUNS**

(Metric Tons)

| | 1958 Planned | 1957 Estimated |
|---|---|---|
| Crude and other stocks charged | 16,008,000[1] | 13,000,000[2] |
| **Refinery production:** | | |
| Gasoline | 3,909,300 | 3,470,000[3] |
| Diesel oil | 4,199,600[4] | 3,600,000[4] |
| Lubricating oils | 494,000 | 447,000 |
| LPGas | 447,120 | ? |
| Jet fuel } Kerosine } | 353,200 | 249,000 |
| Others | 1,409,240[5] | 1,683,000 |
| | | 11,869,000 |
| Consumption by refineries | 984,000[6] | 871,000 |
| Losses | | 260,000 |
| Grand total | | 13,000,000 |

| | 1957 Actual 1st Half | 1st Half 1956 |
|---|---|---|
| **Refinery production:** | | |
| Gasoline | 1,536,020 | 1,556,770 |
| Diesel oil | 1,515,217 | 1,532,974 |
| Fuel oil | 1,139,615 | 1,162,257 |
| Lubricating oils | 192,891 | 250,759 |
| LPGas | 169,624 | 136,041 |
| Kerosine and jet fuel | 44,104 | 97,060 |
| Bitumen | 350,066 | 201,974 |
| Others | 354,031 | 354,530 |
| Totals | 5,301,568 | 5,392,345 |

(1) Consists of 3,805,000 tons German crude, 10,960,000 Middle Eastern, 1,118,000 Venezuelan, and 125,000 Mexican. (2) Consists of 3,805,000 tons German crude, 12,203,000 foreign. 1957 first-half actual crude runs were 5,320,000 tons. (3) Includes white spirit and SPB gasoline. (4) Excludes refinery consumption. (5) Consists of 502,750 tons fuel oil, 344,980 refinery gas, 136,600 coke. (6) Figure—which includes refinery consumption—consists of 463,180 tons fuel gas and 4,474,390 fuel oil. (7) Consists of 925,900 tons bitumen; 52,200 paraffin and slack wax; 253,800 coke; 64,900 residues; 112,440 miscellaneous.

Source: Arbeitsgemeinschaft Erdoel-Gewinnung und Verarbeitung (AEV).


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**Refining:** Of Germany's 18 oil refineries at the beginning of World War II only two were equipped to process crude oil. The others were all based on the further processing of imported petroleum products. During the war most of the oil processing plants were heavily damaged while the bulk of the hydrogenation and synthetic plants were lost at the end of the war since they were located in the Soviet occupation zone.

Refining capacity at the start of 1957 stood at 14,755,000 tons a year (295,100 b/d), compared with 14,685,000 tons a year earlier. Plans are for total capacity of 660,000 b/d by the start of 1960, with four large refineries to be built in the Rhine-Ruhr area. Companies building are Esso, Shell, BP Rhineland and Purfina.

Esso A.G. will start up its projected Cologne refinery months ahead of schedule, in November, 1958. The plant will go on stream with 70,000 b/d capacity, to be expanded to 150,000 b/d by 1961-62. Total cost will be $83.3-million.

The company's Hamburg refinery will be expanded from 50,000 b/d to 60,000 b/d by 1962.

The company's expansion program for the next five years calls for a $221.4-million investment, including $71-million for ten tankers.

Esso will expand capacity of its Hamburg refinery to 53,000 b/d in the 1958-60 period, in the course of improving the 40,000 b/d plant. Esso will invest between $11.8-million and $14.3-million on the project.

Esso A.G. will set up its first major German petrochemical operation in the Cologne area. Its new refinery will go into operation there in 1959 with initial capacity of 70,000 b/d.

The Jersey Standard subsidiary announced that a $14 million petrochemical plant will also go into operation in 1959. Major products will be ethylene, butadiene, and propylene tetramer. Deutsche-Shell AG has announced a $170-million expansion program during next 4 years. It includes expansion of Hamburg-Harburg refinery to 52,000 b/d from 19,500 b/d; new 80,000 b/d refinery between Cologne and Bonn with a 120-mile pipeline to the Rotterdam terminus—plus expansion of petrochemical plant at Wesseling to 30,000 tons yearly olefin products and 36,000 tons ethyl benzene.

Deutsche Shell's projected new refinery on the Rhine will be completed by 1960 with 80,000 b/d capacity.

Construction started on the $63-million plant at Godorf, between Cologne and Bonn. Heating oil—primarily for the Ruhr region—will account for 50%-60% of the plant's output. It will also produce diesel oil, gasoline, and jet fuel.

Crude oil will be supplied by a pipeline connection with Rotterdam, to be built jointly by Shell and Gelsenberg Benzin, a German refiner.

The intersection of the Rhine and Ruhr rivers is the site of a 20,000-bbl. refinery to be built by a West German subsidiary of Cie. Financiere Belge des Petroles. S.A. (Petrofina).

Plans for the new refinery will have no effect on the 6,500-bbl. refinery operated by Ruhrbau Mineraloelraffinerie G.m.b.H., at Muehlheim near Cologne. Petrofina bought a 75% interest in this plant last year. Output of both refineries will be marketed by Deutsche Purifina G.m.b.H. Frankfort.

Union Rheinische Braunkohlen-Kraftstoff of Wesseling has added a catalytic platformer to its plant with capacity of 265,000 tons a year.

BP, third largest oil company in Germany, plans a new refinery with crude throughput capacity of 3,000,000 tons a year (60,000 b/d), which can be increased to 6,000,000 tons. Plant is to be in the Rhineland, either at Cologne or Krefeld. BP&S Hamburg refinery is to be expanded to 2,000,000 tons a year, (40,000 b/d), against 1,500,000 tons at present.

Mobil Oil Co. refinery at Oslebshausen has completed two facilities, a catalytic reformer with 160,000 tons capacity, and a catalytic desulfurizing plant with 240,000 tons capacity. A two-step distillation plant is being completed this year to increase capacity to 1,400,000 tons from 1,250,000 tons.

American Independent Oil Co. has signed a 15-year agreement to supply Persian Gulf crude for a projected 30,000 b/d refinery at Emden.

Ralph M. Parsons Co. of Los Angeles, has been awarded the contract to build the $15-million plant for Erdoelwerke Frisia A.G. The latter was formed earlier this year by Swiss marketer Gottlieb Duttweiler. According to earlier announcements in Germany, Aminoil is also investing in the plant.

A $56 million petrochemical plant is planned for Dormegen, near Cologne, by British Petroleum and Farbenfabriken Bayer will obtain processing stock from BP's 80,000 b/d refinery now building in Cologne.

Tidewater Oil Co. plans to build a refinery and a petrochemical plant near Dinslaken, in the Lower Rhine area.

Scholven-Chemia A.F., Oelsenkirchen-Buer, plans to increase its refinery at Buer from the present 750,000 tons a year capacity to 2,000,000 tons.

**Transportation:** The German tankerfleet at the beginning of 1957 consisted of 600,000 dwt. In addition, orders were on hand for another 550,000 dwt.

Internal transportation is carried on mostly by barge and railroad, with the Rhine river as the main shipping artery since it brings the crude oil from Rotterdam to the Rhine/Ruhr refineries. At the moment the country's first major crude oil pipeline is under construction. It will connect the North Sea port of Wilhelmshaven with the Cologne area. The project is financed by the various companies currently building new refineries in the Rhine-Ruhr area. All existing German oil pipelines are only of local importance, none of them being longer than 19 miles. The total oil pipeline net consists of 100 miles of crude oil lines, 70 miles of products lines and 190 miles of gathering pipes.

**Marketing:** Looking ahead petroleum consumption in West Germany, which was 4,300,000 tons (86,000 b/d) in 1950, is expected to be nearly eight times that by 1965. In 1955, consumption was 10,600,000 tons (212,000 b/d); in 1960 some 22,600,000 tons (452,000 b/d) is estimated; in 1965 some 32,600,000 tons (662,000 b/d); in 1970 some 43,800,000 tons (876,000 b/d), and in 1975, about 55,100,000 tons (1,102,000 b/d).

Consumption of fuel oil is expected to increase from 2,100,000 tons (42,000 b/d) in 1955; to 10,400,000 tons (208,000 b/d) in 1960; and to 31,300,000 tons (626,000 b/d) in 1975.

**WEST GERMANY—CONSUMPTION OF OIL PRODUCTS**
(Thousands of Metric Tons)

| | 1965 Planned* | 1958 Planned* | 1957[3] Estimated* | 1956 |
|---|---|---|---|---|
| LPGas | | | | 254 |
| Aviation gasoline | | | | 76 |
| Motor gasoline & benzol | 5,800 | 3,850 | 3,500 | 3,090 |
| White spirit & SBP gas | | | | 178 |
| Kerosine and jet fuel | NS | NS | NS | 61 |
| Diesel oil | 5,800 | 4,000 | 3,700 | 3,371 |
| Lubricating oils | NS | NS | NS | 577 |
| Paraffin | NS | NS | NS | 36 |
| Fuel oils[2] | 17,000 | 7,400 | 5,600 | 3,757[1] |
| Bitumen | NS | NS | NS | 756 |
| Coke | NS | NS | NS | 145 |
| Others | 4,050 | 2,725 | 2,500 | 217 |
| Totals | 32,650 | 17,975 | 15,300 | 12,498 |
| Consumption by German refineries: | | | | |
| Fuel oil | | | | 481[2] |
| Fuel gas, coke, residues | | | | 335 |
| Totals | | | | 816 |
| Total German consumption | | | | 13,314 |
| Total bunker deliveries (ocean-going vessels all flags; from consignment and nonconsignment stocks): | | | | |
| Gas-diesel oils | 1,150 | 860 | 785 | 723 |
| Fuel oils | 2,725 | 1,530 | 1,400 | 1,240 |
| Lubricants | NA | NA | NA | 26 |
| Total deliveries | 3,875 | 2,390 | 2,185 | 1,989 |

NS—not specified. *Figures for 1957, 1958, and 1965 do not include refinery consumption.
(1) In addition, 501,059 tons from coal and shale-oil processing—including 34,853 tons own consumption of refineries.
(2) Includes 49,981 tons imported fuel oil and 5,645 tons crude oil.
(3) 1st quarter 1957 consumption of all products—including refinery consumption and bunker liftings to German flag ships—was 22,939,000 bbl.
NA—Not available.

**Sources:** Statistisches Bundesamt—Assenstelle Hamburg—Mineraloelstatistik; and Arbeitsgemeinschaft Erdoel-Gewinnung und Verarbeitung (AEV).

## Oil Law Summary*

The various states of Germany have separate petroleum laws, but all are similar to the Prussian Petroleum Act of December 13, 1934, as summarized here. All subsoil rights reserved to State following passage of act; previous concessions still pay royalty interests to private parties.

**RECONNAISSANCE:** Preliminary permit for geological and geophysical work grantable. Separate permit necessary for drilling. No taxes or fees specified.

**EXPLORATION:** Granted subsequent to reconnaissance permit. **Duration:** 5 years. **Maximum Size:** 500 sq. km. **Drilling:** Obligation may be contained. **Fee:** $238 payable on signature. **Transfer:** Subject to government approval. Must compensate real-estate owners for loss of usufruct and damage.

**EXPLOITATION:** Guaranteed to holder of exploration area: **Area:** Split into lots extending up to 4.4 km. around drilling well. **Duration:** 30 years. **Work Obligation:** Must begin development within "reasonable period"; thereafter continue with "diligence." **Surrender:** Any time. **Royalty:** 5%. **Expiration:** Operating equipment passes to state. **Transfer:** Only with government approval. Transferee must prove financial qualifications equivalent to cost of three deep wells, generally speaking. **Income Tax:** 45% on net profit of corporations. Company foundation tax, 3% of capital paid in. Property tax, 1% of value of property.

*Source: World Petroleum Legislation, 604 Fifth Ave., New York 20, N. Y. (see p's 37-38.)

**WEST GERMANY—PROVED OIL RESERVES**
(Thousands of Tons)
(As of January 1, 1957)

| Area | Proved Reserves | Probable Reserves | Total |
|---|---|---|---|
| North of the Elbe | 3,371 | 1,540 | 5,271 |
| Between Elbe and Weser | 19,693 | 3,897 | 23,590 |
| Between Weser and Ems | 9,041 | 3,009 | 12,050 |
| West of Ems (Emsland) | 17,760 | 4,200 | 21,960 |
| Upper Rhine Valley | 1,305 | 1,065 | 2,370 |
| Bavaria | 148 | 1,030 | 1,178 |
| Totals | 51,678 | 14,741 | 66,419 |

During 1955, coal supplied 88% of the energy for Western Germany and petroleum nine per cent, with the rest from water power, natural gas and other sources. By 1960, best estimates foresee coal furnishing 81% of the needs and petroleum supplying 16%.

Total consumption of petroleum products in West Germany came to 13,314,000 metric tons (266,280 b/d) in 1956, up 27.5% from 1955. The figure includes fuel oil and other products used in refineries. Latest estimates for 1957 consumption are 15,286,000 metric tons (305,720 b/d). Remarkable fact in 1956 was increase in fuel oil use, rising 79.7% to 3,757,000 tons.

Germany exported 1,229,579 metric tons of products during 1956, a gain from 934,944 tons in 1955. Leading export was gasoline, 373,170 tons, followed by fuel oil, 275,420, and gas oil, 238,918. Main destinations of German gasoline were Denmark, Norway, Sweden and the United Kingdom.

Germany imported 7,998,736 tons of crude oil during 1956, a gain of 12.5% over 7,111,312 tons the year before. The largest share came from Saudi Arabia, which supplied 2,990,679 tons, followed by Iraq with 2,302,253 and Kuwait with 1,412,845. As a result of the Suez crisis, the U.S. sent some crude to Germany for the first time in years, some 142,429 tons.

Product imports to West Germany by type of product, in 1956:

| Product | | | Added Imports From Soviet Zone of Gery |
|---|---|---|---|
| Gasoline | 61,804 | 181,865 | 78,681 |
| Diesel oil | 332,683 | 397,620 | 98,981 |
| Fuel oil | 1,166,664 | 2,391,369 | 418 |
| Aviation gasol | 68,628 | 141,923 | — |
| Lube oils | 113,835 | 130,347 | — |
| Jet fuels | 95,134 | 78,233 | — |
| Other | 97,669 | 208,746 | 121,464 |
| Total | 1,936,417 | 3,530,103 | 299,144 |

Soviet bloc imports included 50,299 tons of fuel oil from Russia; 48,242 tons of fuel oil from Romania; 43,522 tons of fuel oil from Hungary; 21,041 tons of fuel oil from Czechoslovakia; 14,064 tons of fuel oil from Yugoslavia; and 9,565 tons of fuel oil from Poland.

### NATIONAL FACTORS

The political and economic climate of West Germany is favorable to investment by foreign capital. Under provision of 1955 law (Mitteilung No. 6034/55, July 6, 1955) the provisions regarding investment from outside the country are summarized. In general, investors are permitted only to invest by purchasing liberalized capital marks. Investment may not be made directly in dollars. The capital marks (worth about 4.25 per U.S. dollar) may be freely traded in and the investor will usually receive his interest in dollars but if he liquidates the investment he will receive the proceeds in capital marks which he can sell at their then-current rate.

**GERMAN PIPELINES**

**Crude-Oil**

| From: | Crude Lines to: | Miles | Diameter (Inches) |
|---|---|---|---|
| Duisburg | Gelsenkirchen | 23.0 | 8 |
| Heide | Brunsbuettelkoog | 19.8 | 6 |
| Eldingen | Nienhagen | 17.9 | 6 |
| Nienhagen | Misburg | 16.5 | 6 |
| Osterwald | Holthausen | 13.8 | 5 |
| Hankensbuettel | Hohne | 13.5 | 2½ |
| Ruehlertwist | Osterwold | 10.6 | 5 |
| Wietingsmoor | Barenburg | 8.7 | 5 |
| Voigtei | Liebenau | 8.2 | 6 |
| Duisburg | Oberhausen | 6.8 | 6 |
| Ruehlermoor | Dalum | 6.2 | 6 |
| Hohne | Beedenbostel | 5.8 | 4 |
| Petroleum Harbor Hamburg | Refinery Hamburg-Harburg | 5.6 | 14 |
| Berkhoepen | Stederdorf | 5.5 | 3 |
| Colum | Holthausen | 5.4 | 4 |
| Dalum | Geeste | 5.3 | 6 |
| Georgsdorf | Osterwald | 5.0 | 4 |
| Steimbke | Hagen | 4.9 | 8 |
| Reitbrook | Warwisch | 4.3 | 8 |
| Suderbruch | Gilten | 4.0 | 6 |
| Fuhrberg | Oldau | 3.7 | 4 |
| Hemmelte-West | Bartmansholte | 3.6 | 6 |
| Georgsdorf | Osterwald | 3.6 | 4 |
| Fuhrberg-Ost | Hambuehren | 3.4 | 6 |
| Thoeren | Wietze | 3.3 | 8 |
| Thoeren | Wietze | 3.3 | 4 |
| Others | | 36.3 | |
| Total | | 248.0 | |

**GERMAN PIPELINES**

**Natural-Gas Lines**

| | | | |
|---|---|---|---|
| Bentheim | Huels | 47.8 | 8 |
| Rehden | Osnabrueck | 37.3 | 7⅝ |
| Prungstadt | Hoechst | 21.7 | 4 |
| Stockstadt | Ludwigshafen | 21.4 | 8 |
| Frenswegen | Bentheim | 11.5 | 8 |
| Rehden | Aldorf | 9.1 | 3½ |
| Frenswegen | Georgsdorf | 7.3 | 3 |
| Itterbeck-Halle | Frenswegen | 7.2 | 5 |
| Eich | Stockstadt | 6.9 | 4 |
| Adorf | Georgsdorf | 5.0 | 5 |
| Wolfskenlen | Stockstadt | 4.7 | 6 |
| Stockstadt | Worms | 4.0 | 3 |
| Frenswegen | Nordhorn | 2.5 | 3½ & 2⅜ |
| Total | | 186.4 | |

**Products Lines**

(mostly casinghead gas from oil fields)

| | | | |
|---|---|---|---|
| Heide | Brunsbuettelkoog | 19.8 | 5 |
| Hohne | Beedenbostel | 6.5 | 2 |
| Hohne | Beedenbostel | 6.5 | 2 |
| Dalum | Holthausen | 5.4 | 5 |
| Suderbruch | Steimbke | 4.2 | 4 |
| Georgsdorf | Osterwald | 4.0 | 6 |
| Others | | 17.5 | |
| | | 63.9 | |
| Total length of all existing pipelines | | 498.3 | |

**Planned Pipelines**

| | | | |
|---|---|---|---|
| Wilhelmshaven | Ruhr-Rhine district | About 220 | 28 |
| Rotterdam | Godorf (on Rhine) | About 150 | |

# ITALY AND SICILY

### PHYSICAL DEVELOPMENT

**Exploration:** Exploration activity in Italy was concentrated on Sicily during 1957, since operations on the mainland are restricted by the legal situation. Southeast Sicily is the center of activity (although the entire island is a sedimentary basin). Oil was found in 1953 by Gulf, at Ragusa. Gulf drilled five wildcats, at various locations—all dry. Expenditures by Gulf to date are about $50 million. A sixth wildcat is being drilled, and additional wells are planned. Geological and geophysical work in Sicily is very difficult because of the complicated formations of the island.

At Gela, on the south coast, AGIP discovered a field whose oil is heavy—its gravity 6 API—with a high sulfur content. It is necessary to pump about 9% gas oil down the hole in order to produce the heavy crude. Once above ground, an additional 15% must be added to make the oil flow through the pipeline. Net production at Gela No. 1 is about 1,200 b/d from the Dolomite. AGIP is now drilling three additional wells at Gela, and is ordering two new rigs to step up development.

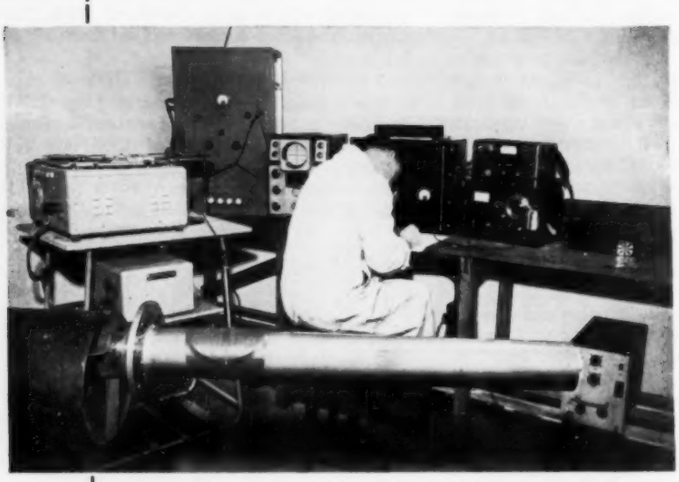
East of Ragusa, at Rosolini, AGIP has a Dolomite well capable of producing up to 1,500 b/d of 15-gravity oil from a thin 58-ft. section. This well may be on the flank of an important structure.

West of Ragusa, at Vittoria, British Petroleum Co.'s Italian subsidiary CISDA has found 9 API gravity oil in the same formation. The company has completion difficulties at the location, but is planning a commercial production test.

Since the close of World War II, 33 wildcats have been completed in Sicily, plus about 38 development wells in the gas fields and at Ragusa. 1958 drilling will continue at probably a higher level.

**Production:** The major producing field in Italy is also in Sicily, at Ragusa. It was discovered in 1943, and presently is producing about 35,000 b/d. Late in September 1957, 27 wells had been completed—of which 24 were being operated. A new pipeline recently has been completed. Three development rigs are being operated in the field, in addition to a light rig for stratigraphic testing.

The 1958 Gulf program envisages completion of about 15 or more development wells. Limits of the field have been defined on the southwest and northwest flanks, as well as to



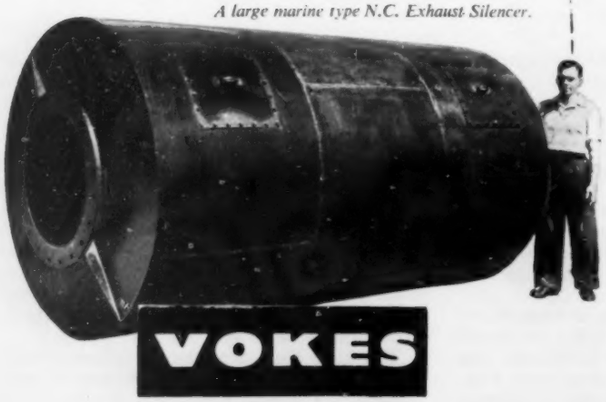
*An N.C. Silencer on test in Vokes Research and Development Laboratory.*

Here is an entirely new Vokes development—the N.C. exhaust silencer. Designed originally for marine use, it is now also available for commercial vehicles and large stationary diesel applications. Offering high efficiency with greatly reduced size, the Vokes N.C. Silencer makes use of the Reflection or Detuning principle. The low back pressure of the N.C. Silencer makes no demand on engine power and lengthens the time between exhaust system clean outs. Of all-steel welded construction, N.C. Silencers have flanges to British Standard Table 'D'. Drain cocks are provided in each chamber and inspection doors allow easy access for cleaning. Please write for further details.

# VOKES N.C.

# *Exhaust Silencers*

*A large marine type N.C. Exhaust Silencer.*



VOKES

*Features of the Vokes N.C. Exhaust Silencer.*

- ★ Minimum space requirement.
- ★ No demand on engine power.
- ★ Longer periods between exhaust clean outs.
- ★ All steel welded construction.
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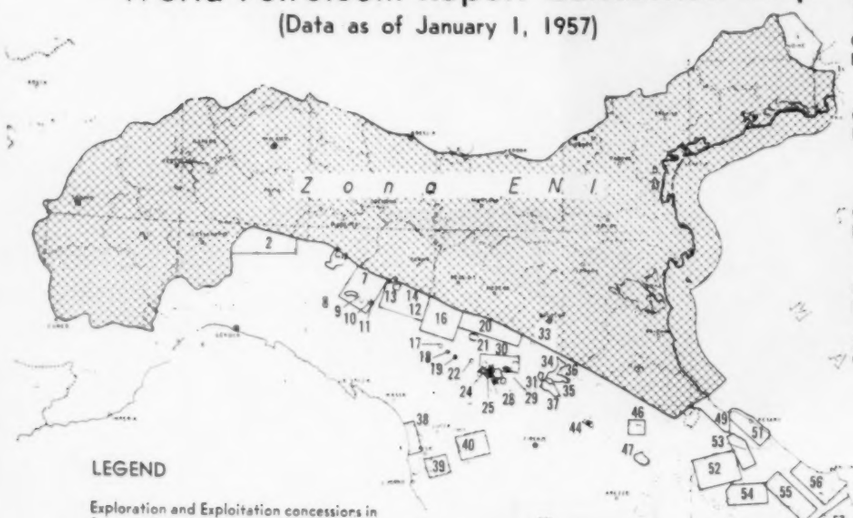
# Italy

## World Petroleum Report Concession Map

(Data as of January 1, 1957)




### LEGEND

Exploration and Exploitation concessions in force and applied for as of date of new oil law (January 1, 1957), including both oil and gas.

### COMPANY

The following companies hold exploration rights as indicated. The numbers following company name correspond to numbers on the map.

| | |
|---|---|
| Soc. AGIP MINERARIA | 1, 2, 7, 16, 52, 55, 56, 57, 58, 65, 66, 77, 78, 85, 95, 123, 131, 135, 136, 144, 145 |
| VICINI PIETRO | 8, 9, 42, 74 |
| CARPANI LINO | 10 |
| Soc. PETROLIFERA ITALIANA—S.P.I. | 12, 20 |
| COMPAGNIA MINERARIA EMILIANA—CO.MI.E. | 17, 22 |
| Soc. IDROELETTRICA ALTO MODENESE | 21 |
| MACCHIA AVERARDO | 24, 23 |
| Soc. Vialis Esperica Trasporti Automobilistici—V.E.T.A. | 25 |
| Impresa F.LLI LAZZI | 30, 31 |
| Soc. CARTIERA DI MARZABOTTO | 33 |
| Soc. IDROCARBURI NAZIONALI—S.I.M. | 36, 37, 49, 34, 35, 44, 41 |
| Soc. DALMINE | 38, 39, 40 |
| Soc. RICERCHE IDROCARBURI PRATESI—R.I.P. | 46 |
| Soc. TIBERINA METANGAS | 47 |
| Soc. Ricerche IDROCARBURI METAURO | 51 |
| Soc. EMILIANA ESERCIZI ELETTRICI | 53, 54, 100 |
| Soc. PETROSUD | 60, 61, 62, 63, 64, 67, 68, 69, 70, 71 |
| Soc. RICERCHE PETROLIFERE ABRUZZO RI.PE.A. | 72 |
| Soc. CHIETI | 73 |
| Soc. IDROCARBURI ABRUZZO S.I.AB. | 75 |
| Soc. MONTECATINI | 76, 80, 84, 86, 96, 146, 147, 148 |
| Soc. SNIA VISCOSA | 81, 82, 104, 105 |
| Soc. SICEDISON | 83 |
| Soc. PONTINA METANO | 88, 89 |
| Soc. TERNI | 90 |
| Soc. Bombrini PARODIDELFINO B.P.D. | 91 |
| Soc. MINERARIA NAZIONALE MI.NA. | 94 |
| CITIES SERVICE MID EAST OIL CORP —Soc. p. Az. | 97, 99, 101, 103 |
| Soc. TERRA APULIAE | 106, 107 |
| Soc. MERIDIONALE METANO—SAMET | 108, 109, 110, 111, 112, 113, 114, 115, 119, 120, 132, 133, 116, 117, 118 |
| Soc. FONDEDILE | 121 |
| Soc. IDROCARBURI MERIDIONALI—S.I.M. | 122 |
| Soc. RICERCHE IDROCARBURI MINERALI E. AFFINI—R.I.M.A. | 124, 125, 126, 127, 129 |
| Soc. ITALIANA RICERCHE—S.ITA.R. | 128, 130 |
| Soc. METANO VALLO DI DIANO—ME. VA. DI. | 134 |
| Soc. RICERCHE PETROLIFERE MERIDIONALI—R.P.M. | 137, 138, 139, 140 |
| Soc. MINERARIA IDROCARBURI E. AFFINI—MIN.I.A. | 141, 142, 143 |

### LEGEND

Po Valley Zone—Held under monopoly by government's ENI under Law No. 136 of February 10, 1953

| Over 500 Hectares | Under 500 Hectares | |
|---|---|---|
| | | Exploration permits applied for whose boundaries were in conformity with original limits and are unchanged. |
| | | Exploration permits applied for whose boundaries were changed to conform with requirements. Broken lines indicate original boundaries; continuous lines indicate new boundaries. |
| | | Exploitation concessions applied for whose boundaries were in conformity with original limits and are unchanged. |
| | | Exploitation concessions applied for whose boundaries changed to conform with requirements. Broken lines indicate original boundaries; continuous lines indicate new boundaries. |

The following companies hold exploitation rights as indicated.
The numbers following company name correspond to numbers on the map:

| | |
|---|---|
| Soc. PETROLI D'ITALIA | 5 |
| CARPANI LINO | 11 |
| Soc. PETROLIFERA ITALIANA—S.P.I. | 13, 14 |
| Soc. IDROELETTRICA ALTO MODENESE | 18, 19 |
| Soc. VIALIS ESPERICA TRANSPORTI AUTOMOBILISTICI—V.E.T.A. | 26 |
| Impresa F. LLI LAZZI | 28 |
| GHERARDI AUGUSTO (Eredi di) | 29 |
| Soc. IDROCARBURI NAZIONALI S.I.N. | 34, 35, 44 |
| Soc. VICTORIA | 93 |
| Soc. AGIP MINERARIA | 99 |

Taken from Govt's Bollettino Ufficiale of July 31, 1957 [Anno 1—No. 3]. Original Scale 1:1,000,000

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*"Knowing"* tool joints doesn't necessarily mean knowing tool joint technology, even though, with Straight Grip, service in the field is a direct result of proper design and research by the manufacturer.

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Men who *know* tool joints specify Straight Grip from experience. Longer life, trouble-free operation, additional footage at less per-foot cost, plus the guarantee of satisfaction because it's American Iron.

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the east, but no indication of the limit has been found to the west. At the center of the field the producing section has a thickness of about 1,500 ft., including the gas cap. Oil is 19.5 to 19.7 API gravity, sweet crude. It is a high-viscosity oil at low temperature, testing 6,000 Saybolt sec. at 60 F. All wells are being pumped, although some will flow. They are producing at an average of about 200 b/d per well. A 41-mile 14-in. pipeline was laid in 1957 to the Augusta tank farm near the RAISOM refinery. A 4.2-mile extension of 30-in. line to the Magnisi peninsula is being built which will deliver 15,000 to 20,000 bbl. per hour by gravity.

Principal news on the mainland of Italy was the discovery by Gulf's former partner, Montecatini, of a second producing zone in the Cigno field. Gulf Oil Corp. formerly owned half this field, but abandoned its interest there when the Italian oil law was passed.

Preliminary reports indicate Cigno 7 as having been completed in the second pay zone about 300 ft. deeper than Gulf's original discovery in January 1955. This would be about 2,624 ft. Eight wells have been completed so far, but one well has been producing considerable salt water—hindering development.

The other major explorer in Italy is AGIP-Mineraria, subsidiary of ENI. Exploratory drilling was done during 1957 at Milan, Cremona, Novara, and Venice. No discoveries were reported.

Sicily has autonomous status as a province of Italy and, therefore, operates under a separate oil law—which explains the rapid development there. Another province of Italy in a similar situation is Sardinia. A more favorable law there led a West German oil company, Wintershall AG, to begin exploratory operations through Azioni Idrocarburi Sardegna (SAIS). Exploration rights over 3,500 square miles, covering the western half of the island, have been granted the company. No drilling is planned for 1958; however, geological mapping and geophysical work will be undertaken.

**Production:** Aside from production at Ragusa in Sicily—previously covered herein—production in Italy is from four small fields in the Po Valley of northern Italy. These are Cortemaggiore, Ripi, S. Giorgio, and Tramutola. These fields produced about 4,000 b/d in 1957, and 4,150 b/d in 1956. Exact statistics for 1957 have not as yet been made available by the government. Natural gas is extremely important in Italian production and the levels are among the highest in Europe. Natural-gas reserves are estimated at 135 billion cubic meters as of October 1957. This is equivalent to 27 years' consumption. No figures on oil reserves are available.

**Refining:** No aspect of Italian oil operations was particularly affected by the Suez crisis during 1957, and refining was no exception. Refining capacity already far exceeds domestic demand. This may be boosted by 617,000 b/d if 100 applications for permits which are presently pending are approved. They would expand crude refining capacity to about 1,232,800 b/d. Eighteen applications have been received for permits to build new oil refineries.

A newly constructed GOLFO refinery began operation at Gaeta, September 6, 1957. Capacity is 20,000 b/d.

The government of Italy and Petrofina have announced plans for a 50,000 b/d refinery north of Rome.

A 150-metric-ton-per-day ammonia-synthesis gas generation plant will be built at Sincat, Sicily. Sincat is a newly formed petrochemical company, wholly owned by the Edison Co., Italy's major public utility. Foster Wheeler Corp. will supply process and mechanical designs, and engineering details.

An important government decision was awaited by Royal Dutch-Shell late in December. Shell's 30,000 b/d plant at La Spezia, on the Italian mainland, is now 29 years old. At building, Shell agreed the government could acquire the plant after 30 years—on one year's notice in advance—in exchange for tax benefits. Government's decision to exercise the option is believed contingent on its ability to absorb new crude supplies under its present refining program.

**Marketing:** Italian consumption of major products rose to 4,428,000 metric tons in the first half of 1957, compared with 4,363,000 tons in the same period of 1956. Fuel-oil consumption was 2.2% higher at 2,920,000 tons. Motor-gasoline consumption was 11.9% higher in the first half of 1957.

### OIL LAWS

Passage of the Italian oil law early in 1957 forced some oil companies, principally Gulf Oil Corp., to leave the country. Other companies, however, considered the law less detrimental; and, as seen from the accompanying map, a considerable number of exploratory applications have been filed.

It was announced during 1957 that the ENI monopoly over the Po Valley will be re-examined. At present, the area is reserved to ENI, a government company, which has done considerable gas development but made no new oil discoveries. Passage of the proposed law would make ENI subject to Art. 12 of the new oil law, which prescribes a 25% deduction of acreage after three years. At present ENI is not subject to this, nor to the exploration and exploitation maximum acreages specified in the law. The head of ENI, Enrico Mattei, is extremely influential in Italy, and passage of this legislation is open to doubt.

Presidential Decree 771 of September 3, 1957, provides duty-free entry of "machinery and material necessary for drilling and exploration, as well as for mining, transportation (pipeline and pumping stations), and storage of products produced within the oil fields and their immediate dependencies."

Rumors during 1957 that a more restrictive law was planned in Sicily were denied by the president of the province of Sicily, who stated that "Despite recent modification of Italian mainland oil laws, no similar change is contemplated in Sicily."

A bill was drawn up early in 1957, and presented to the parliament, for governing exploration and development in offshore Italy. Known as Law No. 6 of January 11, 1957, it governs operations from the shore line out to a depth of 200 meters. It has not yet been approved by parliament. The principal terms of the bill are as follows:

**Exploration:** 247,000 acres per permit. Maximum per concessionaire, 988,000. *Duration:* 6 years. Two extensions possible, each for 3 years. *Drilling:* Must begin within 2 years after exploration has begun. Exploration must begin within 12 months of permit date. *Fee:* 100 lire per hectare of permit area. Increased to 150 lire in first 3-year extension, and to 200 lire before second 3-year extension (one dollar is equal to 625 lire).

**Exploitation:** Conversion guaranteed. Application must be made within 300 days of discovery. *Area:* 22,230 acres per concession. Maximum per concessionaire, 222,300 acres. Continuous band 3 kilometers wide circling concession must be reserved to government. Width of band reduced proportionately with size of area, to minimum 500 meters. *Duration:* 30 years. One extension possible of 10 years. *Surface Tax:* 500 lire per hectare yearly. *Royalty:* Graduated scale from 1% on production per well of 0 bbl. to 8 bbl., rising to 16 2/3% on production per well over 256 bbl. Same royalty applies to natural gas, using 1,200 cubic meters equivalent to one barrel of oil. Royalty payable in cash or in kind. *Other:* Provisions referring to cancellation are identical with those onshore. There are no reservations in favor of the government's ENI in this law.

## Italy
## Oil Law Summary★

**EXPLORATION:** Exploring companies must be domiciled in Italy. **Area:** 125,000 acres per concession. Limit per concessionaire, 750,000 acres in peninsular Italy, or 375,000 acres in any one oil region. Govt. companies exempt from this limitation. **Duration:** 3 yrs. Two extensions of 2 yrs. each possible, plus final 2-yr. extension in event of discovery to permit definition of field. **Surface Tax:** Annual surface tax 200 lire per hectare ($0.128 per acre) during initial term. 300 lire per hectare during 1st extension and 400 lire per hectare during 2nd and following extensions. **Transfer:** Only with govt. consent.

**EXPLOITATION:** Conversion of exploration to exploitation guaranteed over area where discovery made, up to 75% exploration area. Max. per concessionaire, 200,000 acres. Govt. companies not subject to limit. Max. per concession, 25,000 acres. **Duration:** 20 yrs. 10-yr. extension, subject to govt. approval. **Surrender:** In whole or in part any time. Surrendered areas are auctioned to other parties. **Annual Surface Tax:** 1,500 lire per hectare (about US $1.00 per acre). **Royalty:** Based on production per well. Varies from 2½% on production per well up to 30 bbl daily to max. 22% on production of 1,900 bbl daily per well. Royalty on natural gas is the same, using 1,200 cubic meters of gas as equivalent of 1 ton (about 7.5 bbl) of oil. **Income Tax:** Total about 38%, including "Mobile Tax," capital tax, and profits tax of 15%.

★Taken from *World Petroleum Legislation*, 604 Fifth Ave., N. Y. 20, N. Y. (see p's 37-38)

## Sicily
## Oil Law Summary★

**EXPLORATION: Area:** Max. 247,000 acres per concessionaire. No limitation on number of concessions per concessionaire. **Duration:** 3 yrs., two extensions of 3 years each possible. **Area Reduction:** Area of concession must be reduced by 20% at end of first 3-yr. period, and by another 20% in the second 3-yr. period. **Surrender:** All or part at any time. **Work Program:** Program for work must be approved by govt. **Drilling Obligation:** Must begin drilling within 2 yrs. **Annual Surface Tax:** 16¢ per hectare annually. **Transfer:** Only with govt. permission. **Transfer Fee:** $80.00.

**EXPLOITATION: Conversion:** After commercial discovery made, explorer may receive concession. **Duration:** 20 yrs. min., 30 yrs. max. May be extended if obligations fulfilled. **Surface Tax:** 32¢ per acre. **Royalty:** Min. 4%, max. 20% in cash or in kind. May be cancelled for nonpayment, failure to meet drilling obligations, suspension of development, or nonauthorized transfer. **Transportation:** Operation and construction of pipelines may form parts of exploitation concession. Tax payable to be determined in concession.

★Taken from *World Petroleum Legislation*, 604 Fifth Ave., N. Y. 20, N. Y. (see p's 37-38)

# Sicily

World Petroleum Report Concession Map

(Date as of October 31, 1957)

New areas are applied for. May change, pending decision of government regulatory agency.
Items marked "pending application" have not yet been decided upon.

## CONCESSIONAIRES IN SICILY *(Above map)*

### NEW AREAS

| No. | Area | | Owner | Hectares |
|---|---|---|---|---|
| 1 | Marsala | permit | Gulf Italia Co. | 11,150 |
| 2 | Biddusa | " | Silvio Ballerini (ENI) | 32,850 |
| 3 | Trapani ext. | " | Idrocarburi Trapanese (Edison) | 8,350 |
| 4 | Cianciana | " | Montecatini | 14,600 |
| 5 | Monte S. Nicola | " | S.A.I.P. (ENI) | 4,500 |
| 6 | S. Biagio Platani | " | S.A.I.P. (ENI) | 3,000 |
| 7 | S. Biagio Platani | " | Lion Ribera (Lion-Edison) | 10,700 |
| 8 | Ribera | " | Lion Ribera (Lion-Edison) | 8,750 |
| 9 | Geraci Siculo | " | Canada Co. (Canadian So. Petr. Co.) | 10,480 |
| 10 | San Mauro | " | Idrocarburi Piave (Soc. Adr. Elettr. CatinR) | 15,520 |
| 11 | San Mauro | " | Venerando Leonardi (ENI) | 13,500 |
| 12 | Polizzi | " | Akragas (Montecatini) | 14,000 |
| 13 | Zimmara | " | Capizzi S.p.A. (Gulf-Montecatini) | 10,750 |
| 14 | Sperlinga | " | Ravennate Netrano (ENI.?) | 13,350 |
| 15 | S. Stefano Canastra | " | Lion Ribera (Lion-Edison) | 14,250 |
| 16 | Donnafugata | " | S.I.R.P.E. (Edison) | 2,100 |
| 17 | Torrente Ippari | " | McMillan Petroleum Co. | 6,150 |
| 18 | Terlaro | " | Societa A.B.C.D. | 6,380 |
| 19 | Farignana | " | Edison | 15,400 |
| 20 | Isola Grande | " | Soc. Ric. Occid. Idrocarburi (Edison) | 10,450 |
| 21 | San Leonardo (offshore) | " | Soc. Massarenti | 2,200 |
| 22 | Magnisi (offshore) | " | Edison | 3,000 |
| 23 | Augusta ext. (offshore) | " | R.A.S.I.O.M. | 4,000 |
| 24 | Maddalena mare (offshore) | " | Edison | 2,400 |
| 25 | Mascalucia ext. | " | A.R.P.E. (Esso-Rasion) | 2,480 |
| 26 | Francofonte Sud | " | Soc. Idroelettrica Subalpina (Edison) | 5,050 |
| 27 | Porto Empedocle | " | Soc. Meridion. Ricerche Petrol. (Agip?) | 4,130 |
| 28 | Lampedusa and Lampione | " | S.I.R.P.E. (Edison) | 3,600 |
| 29 | Racalmuto | " | C.O.S.I.P. (Sicilian Indep. and Agip?) | 15,840 |
| 30 | Licata | " | Intercontinentale Petroli (Pantepec) | 45,500 |
| 31 | Mazzarino | " | Ric. Petr. Siciliani—R.I.P.E.S.I. (Agip?) | 21,500 |
| 32 | Gela-Ripesi | " | Ric. Petr. Siciliani—R.I.P.E.S.I. (Agip?) | 18,900 |
| 33 | Butera | " | S.I.L.I.A.P.E. (Sicilian Indep. and Agip?) | 28,150 |
| 34 | Pozzillo | " | Agip | 10,200 |
| 35 | Piedimonte | " | S.I.R.P.E. (Edison) | 27,560 |
| 36 | Segesta ext. | " | Soc. Ital. Ric. Idroc.—S.I.R.I. (Edison) | 1,850 |
| 37 | Agnone | " | S.I.R.P.E. (Edison) | 5,610 |
| 38 | Troina | " | S.I.R.P.E. (Edison) | 3,770 |
| 39 | Isola Marettimo | " | Soc. Sicilpetrol | 1,200 |
| 40 | Francofonte ext. | " | Soc. Idroc. Francofonte—S.I.F. (Edison) | 1,300 |
| 41 | Giotto ext. | " | A.R.P.E. (Esso-Rasion) | 412 |
| 42 | Raddusa ext. | " | Lercara S.p.A. | 2,540 |
| 43 | Gela mare (offshore) | " | Ravennate Netano (Agip) | 12,640 |
| 44 | Corlenne | " | Silvio Ballerini (E.N.I.) | 42,950 |
| 45 | Fiume Belica | " | Soc. Idr. Subalpina (Edison) | 17,500 |
| 46 | Monte Bruca | " | Lion Corleone (Edison) | 14,700 |
| 47 | S. Cipirrello | " | Sicilpetrol | 19,600 |
| 48 | Cefala Diana | " | Ravennate Netano (Agip) | 26,350 |
| 49 | Cerda | " | Terzo De Angelis (ENI) | 34,000 |
| 50 | Ciminna | " | Soc. Idrocarburi Piavo (S.A.D.E.) | 8,750 |
| 51 | Termini Imerose | " | Soc. Olii Minerali | 19,000 |
| 52 | Lercara ext. | " | Lercara S.p.A. (Gulf-Montecatini) | 3,185 |
| 53 | Pizzo Corvo | " | SILIAPE (Sicilian Indep. and Agip?) | 15,930 |
| 54 | Monte Pecoraro | " | SILIAPE (Sicilian Indep. and Agip?) | 33,720 |
| 55 | Sicilia Sud-Est Mare | " | Gulf Italia Co. (pending application) | 70,000 |
| 56 | Avola mare | " | Montecatini (pending application) | 4,670 |
| 57 | Madonie (pending applic.) | " | Petroli dell'Isola (Gulf-Montecatini) | 33,000 |

TOTAL HECTARES 792,917 (about 1,982,290 acres)

### OLD AREAS

| No. | Area | | Owner | Hectares |
|---|---|---|---|---|
| I | Ragusa | concession | Gulf Italia Co. | 73,478 |
| II | Fontana Rossa | " | MI.S.O. Minereria Sicilia Orientale (Agip) | 1,717 |
| | | | GULF'S ASSOCIATES | |
| G 1 | Comiso | permit | Mediterranean Oil Co. (Gulf-McMillan) | 9,584 |
| G 2 | Caltanisseta | " | Mediterranean Oil Co. (Gulf-McMillan) | 17,311 |
| G 3 | Aragona-Licata | " | Mediterranean Oil Co. (Gulf-McMillan) | 32,650 |
| G 4 | Lorcara | " | Lorcara S.p.A. (Gulf-Montecatini) | 38,128 |
| G 5 | Raddusa | " | Lorcara S.p.A. (Gulf-Montecatini) | 26,132 |
| G 6 | Capizzi | " | Capizzi S.p.A. (Gulf-Montecatini) | 63,265 |
| G 7 | Fiume Platani | " | Platani Petroli S.p.A. (Gulf-Montecatini) | 64,970 |
| G 8 | Alimena | " | Petroli dell'Isola S.p.A. (Gulf-Montecat.) | 65,902 |
| | | | EDISON'S ASSOCIATES | |
| E 1 | Borrania | " | Ricerche Occidentali Idrocarburi—R.O.I. | 9,924 |
| E 2 | Trapani | " | Societa Idrocarburi Trapanesi—S.I.T. | 42,023 |
| E 3 | Peggiorale | " | Societa Idrocarburi Trapanesi—S.I.T. | 23,480 |
| E 4 | Segesta | " | Soc. Ind. Ric. Idrocarburi—S.I.R.I. | 37,688 |
| E 5 | Barrafranca | " | Soc. Idrocarb. Barrafranca—S.I.B. | 34,955 |
| E 6 | Piazza Armerina | " | Soc. Idroc. Piazza Armerina | 42,476 |
| E 7 | Sigona Brande | " | Soc. Minereria Sigena—S.M.S. | 21,991 |
| E 8 | Francofonte | " | Soc. Idrocarb. Francofonte—S.I.F. | 29,220 |
| E 9 | Lontini I | " | Soc. Ind. Ric. Petrolif.—S.I.R.P.E. | 5,385 |
| E 10 | Siracusa | " | Soc. Idroc. Siracusa—S.I.S. | 68,022 |
| | | | ENI-AGIP and ASSOCIATES | |
| A 1 | Gela | " | Agip | 28,600 |
| A 2 | Castelvetrano | " | Agip | 65,500 |
| A 3 | Chiusa Sclafani | " | Soc. Azion. Impr. Perforaz.—S.A.I.P. | 83,800 |
| A 4 | S. Croce Camerina | " | Soc. Azion. Impr. Perforaz.—S.A.I.P. | 7,520 |
| A 5 | Lercara Friddi | " | Minereria Sicilia Orientale—M.I.S.O. | 17,247 |
| A 6 | Mendolo | " | Minereria Sicilia Orientale—M.I.S.O. | 33,728 |
| A 7 | Balchino | " | Minereria Sicilia Orientale—M.I.S.O. | 10,700 |
| A 8 | Caltagirone | " | Minereria Sicilia Orientale—M.I.S.O. | 9,200 |
| A 9 | Gealiano | " | Vulcano | 68,400 |
| A 10 | Scicli | " | Vulcano | 30,350 |
| A 11 | Noto | " | C.O.R.I.S. (Agip and West Geophys. Co.) | 82,073 |
| | | | OTHER COMPANIES | |
| A | Bagheria | " | Aquileia Miner. (Delta Drilling Co.) | 7,919 |
| B | Montalegro | " | Aquileia Miner. (Delta Drilling Co.) | 7,483 |
| C | Puntasecca | " | Aquileia Miner. (Delta Drilling Co.) | 2,935 |
| D | Giolitto | " | Augusta Ric. Petrol. ARPE (Esso-Rasiom) | 20,614 |
| E | Mascalucia | " | Aug. Ric. Petr.—A.R.P.E. (Esso-Rasiom) | 31,080 |
| F | Augusta | " | Aug. Ric. Petr.—A.R.P.E. (Esso-Rasiom) | 22,440 |
| G | Enna | " | SNIA Viscosa | 69,728 |
| H | Lentini II | " | SNIA Viscosa | 8,164 |
| L | Ramacca | " | SNIA Viscosa | 21,705 |
| M | San Pietro | " | C.I.S.D.A. | 19,507 |
| N | Vittoria | " | C.I.S.D.A. | 45,347 |
| P | La Maddalena | " | France Fenzi | 1,006 |
| E 11 | Castrofilippe | " | Soc. Ind. Ric. Petrol.—S.I.R.P.E. | 12,900 |
| E 12 | Catenanuova | " | Soc. Ind. Ric. Petrol.—S.I.R.P.E. | 26,500 |

TOTAL HECTARES 1,426,524 (about 3,565,000 acres)

# AUSTRIA

## PHYSICAL DEVELOPMENT

**Exploration:** No major discoveries were reported in 1957. Pyrawarth 1 by OeMV, located west of the Matzen field, struck oil at about 7,900 ft, at the base of the Helvetian. Flow tests yielded 28 tons (196 bbl) of light crude with a high gasoline content. However, the pressure declined very soon. The well, which is now on the pump, yields approximately 14 b/d. OeMV, the government's oil administration agency, slowed its wildcatting program during 1957.

RAG's well Wegscheid No. 1, Upper Austria province, showed traces of oil at 8,776 ft. A test between 8,714 ft and 8,786 ft yielded 145 US gal of a crude with a specific gravity of 0.875 and a high gasoline content. The well is to be drilled to 10,170 ft. The pay is only 16 ft thick, and might be in connection with RAG's first discovery well in Upper Austria province which produced 2,562 bbl of 34 API crude in November.

Austrian Mineral Oil Administration (OeMV-AG) and British Petroleum Co. recently reached agreement in London on joint prospecting and exploitation of oil in the areas of Scheibbs and Amstetten (Lower Austria province). Agreement provides for a working group with £100,000 from each partner during the first year. If oil is discovered and larger investments are required, partnership will be converted to a stock company with an expected capital to £1,000,000 from each. Profits are scheduled to be equally divided. Both partners have emphasized agreement is on a mutual-trust basis. The OeMV-AG retains first rights to any oil which may be produced to insure supplies to Austrian refineries, while the British partner has first rights to Austrian refinery products. Agreement may serve as basis for further cooperation as, for instance, in the production and distribution of liquefied gas.

**Production:** During 1957, production continued its downward trend, and declined to about 58,000 b/d by the year's end. Figures for the first half of 1957 show output was 1,622,968 tons in the first six months of 1957, approximately 100,000 tons less than in the same period of the previous year. A decline was noted particularly in the biggest oil field, Matzen-Auersthal, which yielded 64,000 tons less than in the period under comparison. The Muehlberg field lagged behind the results of the previous year by 25,000 tons, Aderklaa by 15,000 tons, and OMV-Neusiedl by 3,500 tons. On the other hand, an increase in production of about 4,600 tons came from the old fields of Zisterdorf and Geiselberg. The RAG field of Puchkirchen, newly discovered in Upper Austria, yielded 1,700 tons more than in the first six months of 1956.

Austria's natural-gas output of 380.4 million cubic meters remained at about the same level as in the first half of 1956 (372.1 million cubic meters).

**Transportation:** There are less than 100 miles of pipeline in Austria at present. They include one small line of about 40 km length to Sokeral; one natural-gas line to Vienna; and one line to the Lobau refinery. The government is about to build a network of gas lines, with about 100 million schillings financing by the government.

OeMV will lay a line from Zwendorf gas field across the Danube to refineries at Schwechat and Kledering. Niogas Co. will continue its line from Schwechat to Wiener Neustadt and Gloggnitz.

**Refining and Marketing:** The Austrian cabinet denationalized the Shell refinery in Floridsdorf, the Socony Mobil refinery in Kagran, and the Rohoel-Gewinnungs (RAG) (Socony-Shell) as a first step toward the implementation of the *Vienna Memorandum*. Apparently for tactical reasons, the Socialist ministers had opposed this decision until after the recently held presidential elections.

An agreement was also reached over the distribution organization and filling stations of the former Deutsche Gasolin AG. From now on, Gasolin AG's installations in all provinces, except Lower Austria and Burgenland, are to belong to Shell and Standard Oil Co. of New Jersey (Esso) in equal shares, whereas the Austrian Republic is to take over the entire property of Gasolin AG in the two remaining provinces. Shell and Esso each had a 25% share in the Austrian assets of Gasolin AG; yet, under the *Vienna Memorandum*, they were to receive also the former German shares in western Austria in exchange for a waiver to their rights to Gasolin AG's property in the eastern parts of the country.

The government decided in principle to restore the Lobau refinery and the Zistersdorf-Lobau oil pipeline to their former owners, Anglo-Saxon Petroleum Co. Ltd., London, and Socony-Mobil, New York, as was provided in the *Vienna Memorandum*. Prior to a final settlement, negotiations will first have to establish the value of investments carried out since 1945, the year of expropriation.

OeMV has decided to build its new refinery at Schwechat, near Vienna. The refinery will go onstream late in 1959—with a capacity of 1.6 million metric tons a year, to be raised to

**AUSTRIA—EXPLORATION DATA, Year-End 1956**

| | Rigs in Operation | Oil | Wells Gas | Dry | Exploratory Footage Drilled |
|---|---|---|---|---|---|
| Van Sickle | 4 | 40 | 2 | N.A. | 12,140 (planned for '57) |
| RAG | | 74 | 3 | 2 | 25,523 |
| OeMV | 23 | 125 | 5 | 12 | NA |

NA—Not available.

**AUSTRIA'S OIL RESERVES**
on January 1, 1956
(Million Barrels)

| Field | Concession | Proven | Probable | Ultimate |
|---|---|---|---|---|
| Matzen | OeMV | 295.4 | 82.6 | 457.1 |
| Aderklaa | OeMV | 4.2 | — | 14.0 |
| Rabensburg | OeMV | — | 0.7 | 0.7 |
| Muehlberg | OeMV | 13.3 | — | 36.4 |
| St. Ulrich etc. | OeMV | 2.8 | — | 28.7 |
| Total | OeMV | 315.7 | 83.3 | 536.9 |
| Goesting | EPG | 1.4 | — | 12.6 |
| Plattwald | VS | 0.7 | — | 8.4 |
| Geiselberg | RAG | 7.0 | 1.4 | 30.8 |
| Total | | 324.8 | 84.7 | 588.7 |

**AUSTRIA—PRODUCTION AND DRILLING DATA**

| Name of Field | Year Discovered | Number of Wells 1957 | Number of Wells 1955 | Depth Feet | Producing Formation | API Gravity | Production in 1955 (Thousands of Barrels) | Production Cumulative through 1955 (Thousands of Barrels) | Daily Average Production in 1956 |
|---|---|---|---|---|---|---|---|---|---|
| Matzen-Bockfliess-Prottes-Schoenkirchen | 1949-50 | 98 | 332 | 4,429-95 5,446-6,397 | 16th Tortonian-Helvetian | 23-41 | 20,112 | 79,914 | 50,719** |
| Muehlberg | 1942 | 2 | 94 | | | | 2,300 | 23,076 | 5,062 |
| Aderklaa | 1949-50 | 3 | 34 | | 5th Tortonian | 39-46.5 | 1,228 | 9,448 | 1,806 |
| St. Ulrichen-Hauskirchen | 1938 | NA | 153 | | | | 673 | 26,198 | NA |
| Maustrenk | 1940 | NA | 15 | | | | 39 | 1,500 | NA |
| Suessenbruenn | 1951 | NA | — | | | | 8 | 139 | NA |
| Rabensburg | 1954 | NA | — | | | | 8 | 8 | NA |
| Hohenruppersdorf | 1941 | NA | 1 | | | | 5 | 116 | 2,714 |
| Alt Lichtenwarth | 1949 | NA | 9 | | | | · | 33 | NA |
| Neusiedl | 1936 | NA | — | 2,900 | | 22-29 | — | 176 | NA |
| Scharfeneck | 1944 | NA | — | | | | — | 25 | NA |
| Windisch-Baumgarten | 1930 | NA | — | | | | — | 4 | NA |
| Geiselberg | 1938 | NA | 53 | | | | 261 | 17,031 | 2,104† |
| RAG | 1937 | NA | 17 | | | | 115 | 5,158 | NA |
| Van Sickle | 1939-40 | NA | 33 | | | | 210 | 7,518 | NA |
| Plattswald | 1940 | NA | 8 | | | | 33 | 384 | NA |
| Goesting | 1931 | NA | 41 | | | | 291 | 11,267 | 676 |
| Kreuzfeld-Pioner | 1940-41 | NA | 3 | | | | 9 | 116 | NA |
| Puchkirchen | 1956 | | | 7,372-8,606 | | 34 | | | 107 |
| Totals wells (1955)* | | | 793 | | | | | | |
| Total, thousands of barrels | | | | | | | 25,656 | 182,111 | |
| Average production, b/d | | | | | | | | | 63,188‡ |

*As of November 1956, wells totaled 889—of which 642 were pumping and 247 flowing. **This is for Matzen-Auersthal. †This is for Zistersdorf-Geiselberg. ‡Total production for 1st half 1957, 1,622,968 tons, or average 62,000 b/d. NA—Not available.

**Note:** As of January 1, 1956, total reserves of the country were 58 million tons (394,400,000 obl at conversion factor of 6.81).

2.5 million tons by 1962. It will include a gas-separation unit, and utilize gases from thermal cracking for producing polyethylene for the plastics industry. The total cost is estimated at 1,000 million schillings.

Ceiling prices on crude have been removed or revised. Product prices remain subject to ceilings, however. Former crude prices ranged from US $85.50 per ton from Austrian Oil Mineral Administration to US $125.81 from Van Sickle.

## NATIONAL FACTORS

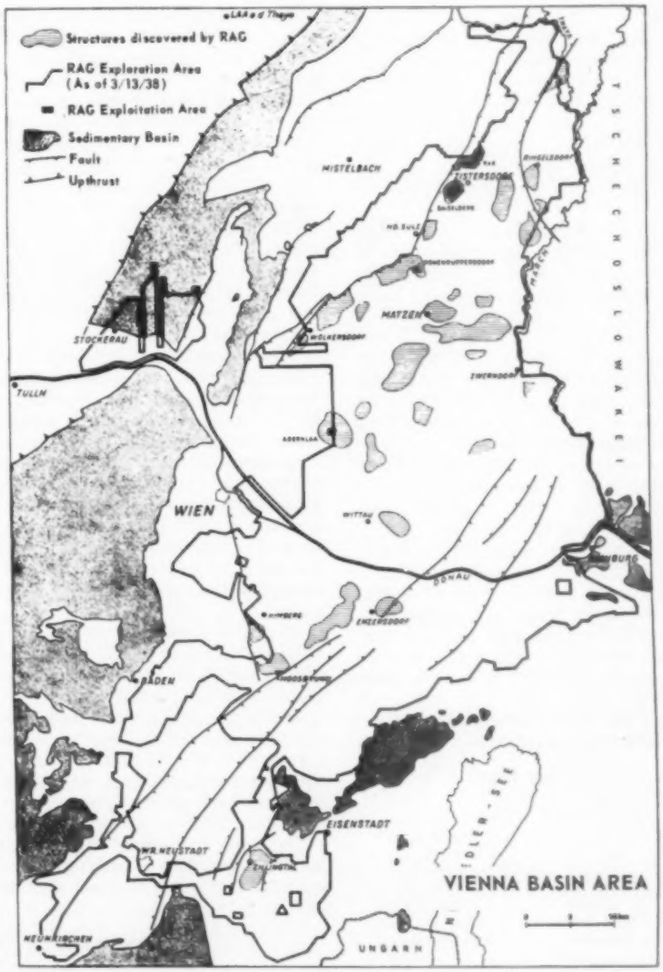
The situation in Austria hinges on legal regulation of oil operations, as shown by the experience of the largest privately owned company in the country, RAG. RAG first obtained oil rights through purchase from other companies and individuals, as well as by registration with the Mining Authority of "Freischürf" grants for exploration. Each Freischürf covered a circular area having a radius of 425 meters. Conversion to "Grubenmasse" (exploration rights) was guaranteed if obligations were met. These Grubenmasse had no time limit, and were inalienable. They had an area of 36 hectares, and one could be granted only for each producing oil or gas well.

Following the German invasion, the Bitumen Law was introduced, August 31, 1938. It has since been adopted verbatim by Austrian Law. Par. 1 introduced the concept of State-owned mineral rights. Par. 5 provided Freischürf had to be converted to Grubenmasse by July 31, 1940 (or application made therefor) or surrendered. This was impossible on most RAG areas due to lack of drilling prospects in the time allotted. Assurance was given RAG, however, that concessions would eventually be given over the surrendered Freischürf areas. Applications by the company were denied in 1938 and 1939, and the company was forbidden to drill new areas (such as Matzen structure which had been mapped). Then, in 1942, the exploration areas were given to German firms. RAG was reimbursed in part for its exploration expenditures over them.

Following World War II, RAG again applied for its exploration areas. They were taken over physically by the Russians, however, except for the company's very small Grubenfelder holdings, as "German assets."

The Austrian government recognized RAG's holdings, and in the *Vienna Memorandum* of May 10, 1955, stated that Austria proposed to fulfill its obligations "by endeavoring to conclude operating agreements with this firm satisfactory to both parties" for the purpose of developing the oil resources of Austria.

On the strength of this, RAG in 1948 and 1951 accepted from the Federal Geological Institute so-called "exploration orders," over about 1,358,500 acres in Upper Austria, Salzburg, and Styria. These "exploration orders" carried no rights to exploitation even if oil were found, but the company performed active exploration, and concessions were granted over the areas in April 1955. The first deep tests were drilled shortly thereafter at Bad Hall 1, Geretsberg 1, and Puchkirchen 2. All were unsuccessful. The oil potential of this area of Upper Austria is considered about the same as that of Bavaria, where no commercial oil has been found yet. The company, therefore, depends on conclusion of workable "operating agreements" in the Vienna basin. As of the end of 1957, these had still not been granted. END




### AUSTRIA—REFINING AND MARKETING

(Metric Tons)

| | Refinery Runs* | |
|---|---|---|
| | 1956 | 1955 |
| Crude oil | 2,002,214 | NA |
| Fuel oils | 1,081,359 | 1,028,468 |
| Diesel-gas oils | 531,184 | 580,299 |
| Kerosine | 140,047 | 173,795 |
| Gasoline | 219,402 | 278,738 |
| Lubricating oils | 59,317 | 58,653 |

*Throughout capacity 2,358,500 tons (16,027,800 bbl—44,000 b/d).

Source: Association of the Austrian Petroleum Industry.

### REFINERIES IN AUSTRIA—1957

| *Name of Company* | *Plant Location* | *Crude Capacity* | *Type Plant* | *Cracking Capacity* |
|---|---|---|---|---|
| A. G. der Shell | Florisdorf | 4,000 | Comp. | |
| Mobil Oil (Austria) A. G. | Kagran | 4,500 | SLA | |
| Richard K. van Sickle | Neusiedl/Zaya | 360 | S | |
| Oesterreichische Mineraloelwerke | Kledering | 150 | SL | |
| " | Voesendorf | 2,300 | SLA | |
| " | Korneuburg | 7,000 | SLA | |
| " | Schwechat | 13,300 | Comp. | 5,000T |
| " | Lobau | 8,800 | S | |
| " | Moosbierbaum | 7,000 | SC | 6,000T |
| | | 47,410 | | 11,000T |

Note: *Plants are listed according to present management. Nationalization of Shell and Mobil refineries has been proposed but suspended. Others except the van Sickle plant built in 1956 are now managed by OeMV.*

Capacities are in barrels per day. Key to type of plant: S—skimming; L—lubricating; A—Asphalt; C—cracking; Comp.—complete. Under cracking capacity to indicate type: T—Thermal; C—Catalytic. All data as of December 1, 1957.

# RUSSIA *and other Communist Countries*

## PHYSICAL DEVELOPMENT

**Exploration:** Approximately 47% of Russia's land area of 8,648,640 square miles is a sedimentary basin favorable for oil accumulation. This would give a sedimentary-basin area of four million square miles, of which nearly one-tenth is continental-shelf area. The Caspian Sea and, in the north, the Barents and Kara Seas offer the best prospects for offshore drilling.

Russia's ultimate oil reserves may represent about one-third the world's geological reserves. Its producible reserves amount to approximately 23 billion barrels. This represents some 15% of the world's proved reserves.

Although the number of drilling rigs in operation was reduced in 1956 to 740 from 1,220 in 1954, and drilled footage during this period increased only by 2.8%, crude production rose in 1956 to 83.6 million tons (1,672,000 b/d, approx.) from 70.7 million tons in 1955. Some 2,000 wells were drilled during 1956. Crude production which in 1957 amounted to some 98 million tons (1,960,000 b/d, approx.) may reach 350 to 400 million tons by 1972.

Drilling plans call for 18,593,427 ft. in 1957, 25,919,900 ft. in 1960. Prospecting work in 1957 was carried out in more than 60 areas. It was intensified in the Volga region, in western Siberia, and in Central Asia. 64% of production comes from the Tartar and the Bashkir Autonomous Soviet Socialist Republics, and from Kuybyshev Oblast.

Production by the whole Soviet bloc, including China, in 1956 was as follows:

| | (Metric Tons) | |
|---|---|---|
| Country | 1956 | 1957 |
| Soviet Union | 83,600,000 | 98,000,000 (est.) |
| Romania | 10,920,467 | 11,320,000 (est.) |
| Hungary | 1,202,149 | 672,000 (plan) |
| Albania | 330,000 | 500,000 (est.) |
| Bulgaria | 246,790 | 280,000 (plan) |
| Czechoslovakia | 180,000 | 180,000 (est.) |
| Poland | 183,687 | 175,000 (plan) |
| China | 1,163,000 | 1,500,000 (est.) |
| Soviet bloc | 97,826,093 (1,956,422 b/d approx.) | 112,627,000 (2,252,540 b/d approx.) |

est.: Estimate, no official figure available.
plan: Planned output.

In September 1957, the Soviet Union announced that in 1959 the current Five-Year Plan will be replaced by a Seven-Year Plan, as new discoveries of oil and other mineral resources have opened up vast possibilities for "new enterprises and new industrial centers."

Communist Party Leader Nikita Krushchev said Russia will quadruple oil production in the next 15 years, and will increase gas production at a much greater ratio. Daily oil production by 1972 will be hiked to between 7,000,000 b/d and 8,000,000 b/d.

He said the Russians plan to increase natural-gas production by 13 to 15 times in the next 10 to 15 years, to a total of about 10,417,630 million cubic feet per year. In 1956 annual production was only 483,802 million cubic feet.

**Transportation and Refining:** In 1956, 47 million tons (940,000 b/d) of crude were run to refineries through pipelines; the remaining 37 million tons were transported by rail or sea. Pipeline transport of crude in 1957 was to increase by 20% compared with 1956.

Several pipelines were completed during 1957. Commissioned were the 114-mile Omsk-Tatarskaya gasoline pipeline which will be extended to Novosibirsk; the 279-mile Almetyevsk-Gorkiy crude line, the second 279-mile Almetyevsk-Molotov (PERM) crude line, and the 196-mile Shirnovskiy-Stalingrad crude pipeline. A 3.4-mile Artem Island-Apsheron Peninsula under-water crude pipeline was completed. Laying of a 12.4-mile under-water crude pipeline from Neftyanie Kamni to Shiloy Island also began in 1957. Several sections of the 2,500-mile Tuymazy-Irkutsk oil pipeline were completed.

The gas-pipeline network, without field gathering lines, was 4,099 miles at the beginning of 1957; 77% were used for natural gas. By 1960, 9,315 miles of gas pipeline are to be added. At present 50 gas deposits are being exploited: 39 in the RSFSR, 9 in the Ukraine. Natural-gas production in 1960, originally planned to be 1,412 billion cubic feet, is to amount to 1.995 billion cubic feet, and in 1972 to between 9 534 and 11,299 billion cubic feet. Future gas pipelines are to be built with 32-in. pipe; pumping stations are to be controlled by radio.

The total length of all trunk oil pipelines in the USSR is expected to go up from 11,500 kilometers (with an average diameter of 20 in. and with 101 pumping stations) as of January 1, 1957, to 14,500 kilometers by 1960. In 1955, pipelines accounted for 77% of all crude-oil transport in the country (but only for 31% of the combined crude-oil and products transport), and this proportion is expected to go up to 84% in 1960.

The exact tonnage of the Soviet tanker fleet is not known. It was estimated at 63 oil tankers of 572,816 dwt at the end of 1956.

## HUNGARY

During the past 20 years, since the first oil production in commercial quantities in 1938, Hungary has produced 13,247,446 metric tons of oil, and 247 billion cubic feet of gas. Twenty-nine oil and gas deposits of varying sizes were discovered.

Crude production, in selected years, is estimated as follows:

| Year | Production (Tons) |
|---|---|
| 1938 | 43,000 |
| 1943 | 838,000 |
| 1948 | 483,000 |
| 1949 | 506,000 |
| 1950 | 512 000 |
| 1951 | 499,000 |
| 1952 | 598,000 |
| 1953 | 846,000 |
| 1954 | 1,217,000 |
| 1955 | 1,601,000 |
| 1956 | 1,202,149 |
| 1957 | 672,000 (plan) |

The sharp increase of crude production since 1951 was due to the discovery of Nagylengyel which soon produced more oil than all other fields put together. The declining production since 1955 was due to water encroachment at Nagylengyel.

Crude reserves are estimated at 20 million tons (150 million barrels); they are to be increased to 30 million tons by 1960. During the period 1956 to 1960, total footage drilled is to amount to 3,937,200 ft., against 2,067,030 ft. in the 1950 to 1954 period. Depths of from 13,124 ft. to 16,405 ft. are to be explored. The first 13,124-ft. well at Lovaszi, in February 1957, was dry.

**Refining and Marketing:** The refineries at Almasfuezitoe and Csepel are of pre-World War II vintage. The refineries at Szoeny and Petfuerdoe were built by Germany during World War II.

Hungary, which used to export oil, has turned into an importer. In 1956, 329,000 tons of crude were imported (45,000 tons from Bulgaria and 284,000 tons of Austrian reparation oil from the Soviet Union).

**HUNGARY—FOOTAGE DRILLED DURING 1950-1955**
(Thousands of Feet)

| | 1950 | 1951 | 1952 | 1953 | 1954 | 1955 |
|---|---|---|---|---|---|---|
| Exploratory | 207.9 | 292.4 | 453.7 | 653.3 | 469.5 | 406.8 |
| Development | 258.5 | 424.8 | 473.0 | 250.0 | 113.7 | 91.5 |
| Total | 466.4 | 717.2 | 926.7 | 903.3 | 583.2 | 498.3 |

**HUNGARY—PRODUCTION COSTS PER TON, 1957 (2nd Quarter)**

| Type Production | Cost (Forints) |
|---|---|
| Deep pumping | 21.03 |
| Gas-lift | 60.78 |
| Flowing | 19.19 |
| Other methods | 14.45 |

One US dollar per 11.7 forints. Costs are given in forints.

## ROMANIA

**Production:** The 100th anniversary of the oil industry was celebrated in Romania during 1957. It dates from the 1857 construction of the Rifov refinery for kerosine to light Bucharest streets.

Crude production in 1957 rose to 11,320,000 tons (226,400 b/d, approx.).

Footage drilled in 1956 was 2,944,366 ft. At the beginning of 1957, some 4,000 wells were producing oil. For lack of spectacular field discoveries, all possible means are being employed in order to obtain a maximum recovery rate. In the old Bodesti field, with reserves estimated at 70 million tons, gas-repressuring and water-flooding recovery methods are used. This area succeeded in producing about 12,000 tons of oil more than the plan had provided.

A field with great prospects is said to be Vedea, in the Pitesti region. Since 1955, more than 130 producers have been drilled there which yield a total of some 1,200 tons per day (7,200 b/d) of oil from shallow depth. The field also supplies Pitesti with gas.

A speeding up of drilling operations was reported from the fields Valea Caselor and Leordeni (Pitesti region) where turbines reach an average drilling progress of 26.05 ft. per hour; 82.025 ft. were drilled during the first half of 1957. Well No. 438 at Valea Caselor was Romania's first attempt at dual production.

Proved reserves may be assessed optimistically at 800 million barrels. At the current rate of production, this represents a 10-year supply.

Prospects for new discoveries are dim. This is corroborated by the modest production target of 101 million barrels set for 1960, which represents a planned annual increase in crude production of only 5½%.

**Refining:** Throughput capacity of existing refineries permits the processing of Romania's entire crude production. Her refineries turned out the following products (in metric tons):

| | 1956 | 1955 |
|---|---|---|
| Gasoline | 2,749,625 | 2,635,068 |
| Kerosine* | 1,385,976 | 1,361,871 |
| Diesel fuel | 1,637,087 | 1,625,938 |
| Fuel oil | 4,120,582 | 4,036,547 |

*Including white spirit.

Romania's first gasoline plant, with a capacity of 17,655,000 cu. ft. of gas and an expected output of 27 tons of casinghead gasoline per day, was commissioned in Oltenia. This region also received its second desalting plant—Romania's biggest.

**Transportation:** The following gas pipelines were finished in 1957: 44-mile line from Gura Sutii (near Tirgoviste) to Bucharest, which is to supply the capital with 21,186,000 cu. ft. per day; 74.5-mile section Bazna-Vintu de Jos-Simeria of the 373-mile pipeline which is to supply Hunedoara, Arad, and Timisoara; 24.8-mile line from Darmanesti to the Borzesti thermoelectric power plant. Under construction was a crude pipeline from Saru to Poiana Lacului.

## SOVIET ORBIT

Excluding Romania and Hungary—which are treated separately—the orbit countries are self-sufficient in oil, except Poland and Czechoslovakia.

*Albania:* Crude production in 1957 was planned to increase by 6%, compared with 1956; gasoline production by 219%; and refined asphalt by 6%. Radio Tirana reported, in September 1957, that crude production planned for 1960 was exceeded in 1957—which would amount to 500,000 tons (10,000 b/d).

Soviet geologists were carrying out an exploration of the entire country for minerals. Exploratory drilling for oil was carried out chiefly in the Myzequeya plain, and for asphalt at Selenitza and Malakastra. Pathos, the most productive oil field, was developed, and deeper horizons explored.

Crude oil and asphalt take first place in Albania's export list. Domestic requirements are negligible. The 150,000-ton-per-year refinery in Cerrik, which the Soviet Union gave to the Albanian government in April 1957, and the 150,000-ton-per-year distillery No. 2 at Stalin, which was completed in March 1957, were expanded in 1957.

*Bulgaria:* Bulgaria's oil production began in 1955.

| Year | Production (Tons) |
|---|---|
| 1955 | 150,014 |
| 1956 | 246,790 |
| 1957 | 280,000 (plan) |
| 1960 | 380,000 (plan) |

Reserves are estimated at 15 million tons (112,500,000 bbl.). The 246,790 tons (4,935 b/d) of crude produced in 1956 came from 120 wells. To date, oil has been found only at Tyulenovo, near the Black Sea coast, and at Krstez, in the central Balkan Mountains. Only the Tyulenovo field yields oil in commercial quantities. Between May 1951 and September 1957, 106 wells out of 158 drilled at Tyulenovo struck oil. The average depth of pay is 1,181 ft. to 1,312 ft. A directional well was begun, in November 1957, at Tyulenovo under the Black Sea.

Only about 50,000 tons of crude can be processed locally; the rest has to be exported. In 1956, 11,000 tons of diesel fuel, 25,000 tons of fuel oil, 7,000 tons of lube oils, and 3,000 tons of asphalt were refined. Throughput capacity was increased in 1957 by 14,000 tons. The gasoline on sale has an octane rating of 60.

USSR delivered following quantities of petroleum products:

| Year | Tons |
|---|---|
| 1945 | 104,300 |
| 1955 | 108,000 |
| 1956 | 117,400 |
| 1957 | 378,700 (plan) |

Imports of petroleum products were:

| Year | Tons |
|---|---|
| 1952 | 302,360 |
| 1953 | 331,900 |
| 1955 | 348,800 |
| 1956 | 443,000 |
| 1957 | 537,000 (plan) |

Imports of products in 1956 were said to have covered 77% of requirements.

*Czechoslovakia:* During 1956-60, planned crude production is to increase by 40%; present crude output is estimated at somewhat less than 200,000 metric tons per year (4,000 b/d).

A breakdown by energy sources shows that oil and natural gas play a minor role: 7.8% of power consumption is covered by liquid fuels, 16% by gas (of which 13% is natural gas), 4.8% by electricity, and 71.4% by coal and coke.

The throughput capacity was estimated at 550,000 tons per year (11,000 b/d) in 1955. During 1956-60, the capacity is to increase by 1.5 million tons. This is probably the capacity of the refinery which is under construction at Vlci Hrdlo, near Podunajske Biskupice, south of Bratislava, whose throughput capacity will be bigger than that of all other refineries together.

85% of imported crude and products are supplied by the Soviet Union. Total crude requirements are estimated at over 900,000 tons per year (18,000 b/d).

Czechoslovakia is also a producer of synthetic fuel. The biggest synthetic gasoline plant is the Stalin Works in Zaluzi, near Most. Another synthetic fuel plant is believed to be under construction with Soviet aid at Cittice, in the Sokolov district. The synthetic fuel production was estimated at 400,000 tons in 1956.

*Poland:* Yearly crude production, according to published Polish sources, follows:

| Year | Tons |
|---|---|
| 1913 | 1,114,000 |
| 1938 | 507,000 |
| 1946 | 117,000 |
| 1947 | 127,000 |
| 1948 | 135,000 |
| 1949 | 151,500 |
| 1950 | 178,000 |
| 1951 | 185,000 |
| 1952 | not available |
| 1953 | 188,800 |
| 1954 | 184,000 |
| 1955 | 178,300 |
| 1956 | 183,687 |
| 1957 | 175,000 (plan) |

Crude production in 1957 was planned to be 175,000 tons (3,500 b/d; 95.3% of 1956 output); natural-gas production 14,477 million cubic feet (94.3% of 1956 output); and refinery throughput 760,000 tons (105.1% compared with 1956).

In the period 1950-55, reserves of 28.8 million tons of oil and 24,650 million cubic meters (870,392 million cubic feet) were to be added. Actually, 1.98 million tons (6.9% of the plan), and 3,457 million cubic meters (122,067 million cubic feet) of gas (14% of the plan) were discovered.

Drilling activity has declined during the 12 postwar years; only 1,217,251 ft. were drilled during this period. In 1956, exploration footage was 264,376 ft., and production footage was 11,999 ft. Total footage drilled in 1957 was 328,100 ft.; 656,200 ft. are planned for 1958, and 1,640,500 ft. for 1960.

There are five obsolete refineries; they are in Czechowice, Glinik-Mariampolski, Jaslo, Jedlicze, and Trzebinia. In 1955, they processed 686,377 tons of crude; and, in 1956, 723,283 tons. The processing of 1.2 million tons of crude is planned for 1960. The Jedlicze refinery was extended in 1957 by the construction of Poland's first furfural-extraction plant with a monthly lube-oil output of 1,500 tons. The Glinik-Mariampolski refinery—one of the oldest in Poland—is to be entirely rebuilt and modernized during the next few years. Its planned future throughput capacity of 150,000 tons per year will suffice to process the entire domestic crude production. The construction of a new modern refinery is being considered.

Poland is almost completely dependent on oil imports. Following tabulations give imports of crude and products as published by Polish sources:

**POLISH CRUDE IMPORTS**
(Thousands of Tons)

| | 1949 | 1953 | 1954 | 1955 | 1956 | 1957 |
|---|---|---|---|---|---|---|
| USSR | | 278.8 | 345.1 | 412.2 | | 720.0* |
| Romania | | 77.7 | 57.9 | 36.0 | | |
| Austria | | 31.3 | 33.9 | 10.1 | | |
| Hungary | | 24.5 | 26.3 | 52.9 | | |
| Total | 91.5 | 412.4 | 463.2 | 544.9 | 548.0 | |

**POLISH IMPORTS OF OIL PRODUCTS**
(Thousands of Tons)

| | | | | | | |
|---|---|---|---|---|---|---|
| USSR | | 156.4 | 287.6 | 239.2 | | 706.0* |
| Romania | | 211.4 | 200.7 | 280.8 | 276.1 | |
| East Germany | | 123.0 | 159.9 | 229.2 | | |
| Hungary | | 13.1 | 31.9 | 49.9 | | |
| Total | 254.8 | 534.5 | 716.2 | 885.7 | 959.0 | 1,300.0* |

**TOTAL IMPORTS OF CRUDE AND PRODUCTS**
(Thousands of Tons)

346.3 946.9 1,179.4 1,430.6 1,507.0 2,000.0*

*(plan).

*Red China:* Crude reserves of the Chinese People's Republic are estimated by the government at one billion tons (7.5 billion barrels). The maximum crude output before the communist seizure was 320,000 tons in 1943. In 1949, crude production was 122,000 tons; in 1952, 436,000 tons; in 1953, 622,000 tons; in 1956, 1,163,000 tons; in 1957 (plan), 1,500,000 tons (30,000 b/d). Due to unexpected discoveries in Tsinghai, Szechwan, and Sinkiang, crude output in 1957 increased to 2,012,000 tons, according to the government.

*East Germany:* East Germany decided in 1957 to boost production, by 1960-70, 150,000 to 200,000 tons (3,000 to 4,000 b/d). Some 20 rigs are in operation. In the district of Schwerin, shows of oil were found at Camin, Perleberg, and Werle. At Gorlosen, several wells encountered oil which may suggest the presence of oil-bearing strata which are a continuation of the West German Celle-Uelzen formation. In the district of Magdeburg, traces of oil were found at Aulosen.

Refineries are turning out a greater variety of products. More Soviet crude and East German brown coal are processed. Production of diesel fuel by means of hydrogenation is increasing. The output of liquid fuels from oil and coal in 1956 was estimated at 1.76 million tons. Construction of a new oil refinery was begun at Luetzkendorf, which is to be finished in 1960. END

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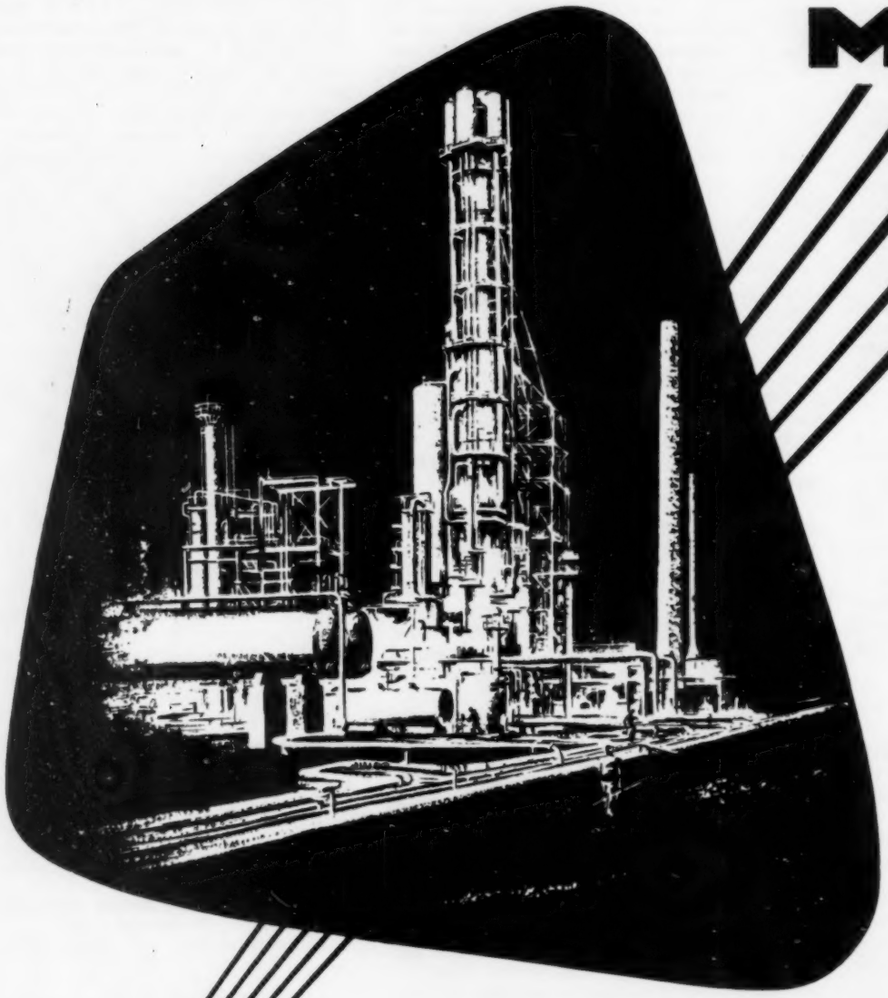

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# PORTUGAL

### PHYSICAL DEVELOPMENT

**Exploration:** Exploration is being conducted over the area indicated on the accompanying concession map by Cia. dos Petroleos de Portugal (CPP), with Mobil Exploration Co. of Portugal Inc., a subsidiary of Socony Mobil Oil Co., supervising the geological studies and drilling under a contract signed February 15, 1955. Casa Prakla, a German company, is doing seismic exploration for CPP on about 350,000 acres, using two crews.

No discoveries have been made to date, as shown by the accompanying drilling table.

**Refining—Marketing:** There is no production in the country, and only one refinery. It is run by SACOR, which is one-third owned by the government of Portugal and has a monopoly over refining till 1976. Crude runs to stills in the first half of 1957 were 497,190 metric tons, equivalent to 19,780 b/d, approximately. Product production was 462,173 tons. Deliveries to ships were 146,438 tons and to aircraft 25,435 tons.

### NATIONAL FACTORS

No change occurred in the various national factors listed in World Petroleum Report 1957. The unit of currency, the escudo, remained at the same rate of about 28.7 per U.S. dollar and no important restrictions were imposed on profit or capital transfers.

Elections were held and the 31-year dictatorship of Premier Antonio de Oliveira Salazar was continued with every government-backed candidate returned to office.

### Oil Law Summary★

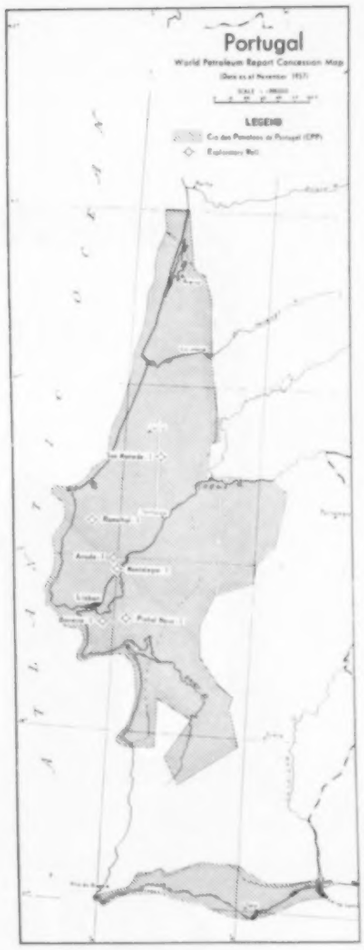
*Subsoil owned by State.*

**RECONNAISSANCE:** Preliminary reconnaissance permitted for 18 months. Guaranty deposit of US $3,250 required. Minimum expenditure US $9,800.

**EXPLORATION: Area:** Not specified. Only existing concession covers most of Portugal. **Duration:** 4 years from beginning drilling. **Drilling:** Must begin within 6 months. **Extension:** Concession may be extended, but guaranty deposit forfeited. **Drilling Obligation:** Must begin within 6 months, continue with no interruptions more than 8 months. 1 or more wells must be drilled totaling approximately 9,900 feet. **Minimum Expenditure:** US $98,000. **Guaranty Deposit:** Deposit made on exploration concession reverts to government. On extension new deposit of US $7,400 must be made, plus US $980 for special inspection expense. **Surface Tax:** US $.0024 per acre up to 1,235,000 acres, declining to US $.0015 per acre over 1,852,500 acres. **Company Formation:** Must organize Portuguese company with minimum cash $140,000 within 20 months.

**EXPLOITATION:** Guaranteed conversion of exploration concession, including related areas not covered. **Duration:** 50 years. Final extension at government discretion of 49 years. **Area:** 1,250 acres, no limit per concessionaire. **Transfer:** Any time, in whole or part, subject to government approval. **Customs Duties:** Exemption given on equipment. **National Consumption:** Must be supplied before exports permitted. **Royalty:** 12½%, in cash, based on value of equivalent US crude. **Employment:** Foreign personnel authorized as necessary. **Surrender:** Anytime. **Surface tax:** Not specified.

★Taken from *World Petroleum Legislation*, 604 Fifth Ave., N. Y. 20, N. Y. (see p's 37-38)




# UNITED KINGDOM

### PHYSICAL DEVELOPMENT

**Exploration:** In Britain, the whole of Scotland other than the eastern part of the Midland Valley, the Lake District, Wales, Devon, and Cornwall are unfavorable for oil accumulation. Within the remainder of the country, the rocks of three systems, the Carboniferous, the Permian, and the Jurassic offer indications of oil and gas. Of these, the Carboniferous prospects are the most favorable, and exploration has been concentrated on them—particularly in the East Midlands, where producing oil fields have been found.

During 1957, seismic and gravity surveys were conducted in several new onshore areas. Eight wildcats were completed without tangible results, and two were drilling at the end of 1957. Six in the East Midlands resulted in five dry holes and one noncommercial gas well.

Seismograph Service Ltd. conducted the first offshore survey in British waters for The British Petroleum Co. Ltd. in 1956. During the first 9 months of 1957, 14 exploratory wells —with total footage of 19,217—were drilled. Drilling rigs in service at the end of September totaled five—three exploratory.

**Production:** Production recovered from the 1956 slump caused by depletion of the main oil fields near Nottingham. In 1956, production from Egmanton field (discovered in 1955) raised production from older fields—increasing output to a daily average of 1,338 bbl. The 1956 total was 95,032 bbl. more—with a 24% rise compared to 1955. 1957 production was up to 1,685 b/d in September.

**Refining:** Britain's refining capacity continued to increase with announcement of several expansion plans. Esso Petroleum Co. Ltd. announced plans for a 100,000 b/d refinery at Milford Haven, along with its planned new port there.

Under a new $12-million plan, BP will add another 20,000 b/d to the capacity of its 44,000 b/d Grangemouth refinery, in Scotland, by replacing its present crude distillation unit. It will also add auxiliary refining units and extra tankage. BP spent $73 million on expansion at Kent, its largest refinery in Britain. The plant's 92,000 b/d capacity was increased to 140,000 b/d.

Plans to erect a plant at Fawley for the manufacture of ethylene-oxide derivatives were announced by Union Carbide Corp. Esso Petroleum Co. Ltd., which currently operates a refinery nearby, is to supply the new plant with ethylene, which will be converted into a number of ethylene-oxide derivatives.

Shell Refining and Marketing Co. Ltd. had an 80,000 b/d distillation unit under construction at Shell Haven, scheduled for third-quarter 1958 completion. Esso Petroleum Co. Ltd. had a 35,000 b/d capacity expansion program under way at Fawley, and a new Hydrofining unit and other facilities under construction.

**Transportation:** The Welsh port of Milford Haven is on its way to becoming one of Europe's biggest oil terminals. It will be capable of handling giant 100,000-ton supertankers by late 1959.

Britain's second terminal for giant super-

**UNITED KINGDOM—WELL DATA**

| | 1957 (As of Sept.) | 1956 |
|---|---|---|
| Exploratory wells drilled: | 14 | 10 |
| Oil producers | — | — |
| Gas producers | — | 1 |
| Dry | 14 | 8* |
| Development wells drilled: | 31 | 11 |
| Oil producers | 25 | |
| Gas producers | — | |
| Dry | 6 | |
| Total wells drilled | 45 | 21** |
| Footage drilled: | 119,280 | 27,380 |
| Exploratory | 19,217 | |
| Development | 100,063 | |
| Drilling rigs in service: | 5 | |
| Exploratory | 3 | |
| Development | 2 | |
| Total wells drilled (cumulative)† | 607 | |

*Plus one drilling.
**Of the 21 wells drilled, 11 were producers and 10 defining wells. The 10 exploratory tests consisted of geological stratigraphic-trap, seismic, surface-anticline, fault-trap, and geological-information holes. Eight were dry, one still drilling, and one a gas producer.
†1936 to end of Sept. 1957.

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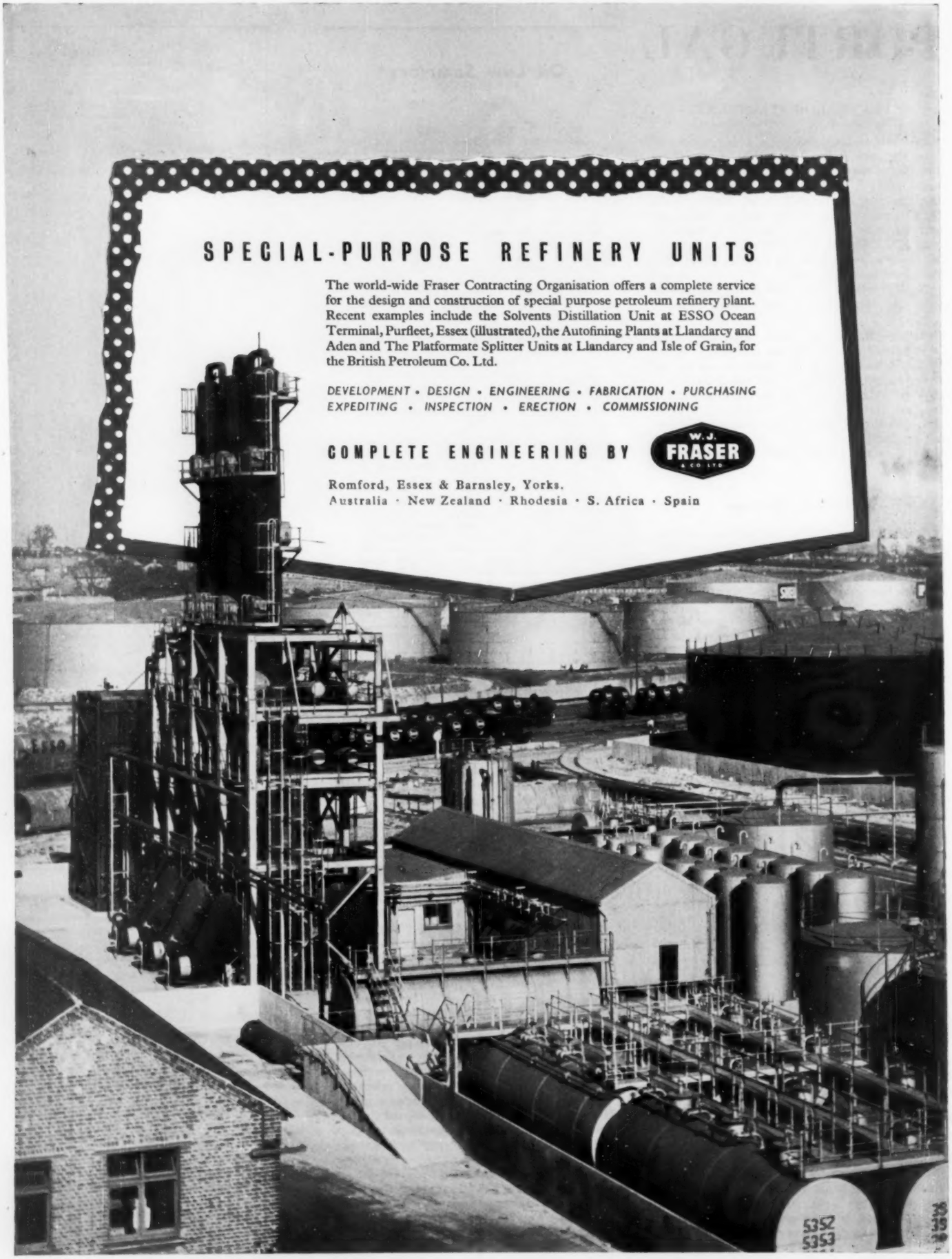


TAS/FS-489

### UNITED KINGDOM—PRODUCTION DATA

U.K.—Pumping wells and field production rates to end September 1957

| Oil Field | Wells on production | Prod. rate—bbls./day |
|---|---|---|
| Eakring | 43 | 110 |
| Duke's Wood | 108 | 540 |
| Kelham Hills | 42 | 290 |
| Caunton | 10 | 25 |
| Egmanton | 18 | 660 |
| Plungar | 6 | 58 |
| Formby | 10 | 2 |
| | 237 | 1685 |

U.K.—Exploratory wells drilled and drilling to end September, 1957

| | | | |
|---|---|---|---|
| Oil producers —Nil | | | |
| Gas producers—Nil | | | |
| Dry Holes— | | | |
| (a) Structure test wells | —6 | Footage | 15,017 |
| (b) Geological structure wells | —8 | Footage | 4,200 |
| | 14 | | 19,217 |

U.K.—Development wells drilled and drilling to end September 1957

| | | | | |
|---|---|---|---|---|
| Oil producers | —wells | 25 | Footage | 79,539 |
| Dry holes | —wells | 6 | Footage | 20,524 |
| | | 31 | | 100,063 |

U.K.—Total wells drilled and drilling to end September 1957

| | | | | |
|---|---|---|---|---|
| Exploratory | —wells | 14 | Footage | 19,217 |
| Development | —wells | 31 | Footage | 100,063 |
| | | 45 | | 119,280 |

U.K.—Drilling rigs in service at end of September 1957

Exploratory — 3 rigs
Development — 2 rigs

U.K.—Cumulative wells and footage since 1936 to end of September 1957

| | | | | |
|---|---|---|---|---|
| Exploratory | —wells | 208 | Footage | 453,298 |
| Development | —wells | 399 | Footage | 847,313 |
| | | 607 | | 1,300,611 |

tankers is slated for construction near Liverpool by Shell Petroleum, at Tranmere. It will include two large floating stages, each of which will accommodate fully-loaded 65,000-ton tankers.

**Marketing:** Total energy demand will grow at an estimated annual rate of 2¼% to 1965—less than the 2½% growth rate in the post-war period 1946-55. This would increase the 1956 total energy demand from 250 million tons of coal equivalent to 305 million tons in 1965.

Coal production would still meet 73% of Britain's 1965 energy needs. The estimate of nuclear power available in 1965 is about 4% of total energy needs. Oil would meet 23% of the energy requirements foreseen.

In 1956, oil filled an energy gap of 34 million tons of coal equivalent. In 1965, it will be 66 million tons of coal equivalent.

Inland consumption of petroleum products in the United Kingdom during the first half of 1957, at 11,540,900 tons, was nearly 9% below the corresponding figure (12,640,200 tons) for 1956.

### OIL LAWS

No change in 1957 in the laws governing oil exploration and exploitation. An error occurred in the description of those laws in *World Petroleum Report 1957*. The third column on p. 258, lines 9 and 10, states: "Minimum annual payment on mining licenses is 3 pence per acre during the first year." In fact, the minimum annual payment is one shilling and 3 pence per acre during the first year, and thereafter—rising, as correctly stated, to 9 shillings per acre in the 10th and subsequent years.

In the same column, in the second line from the end, the article states that the tax on domestic oils is "only 1/3 pence per gallon."

## Oil Law Summary★

Sub-soil rights reserved to government. Legislation does not extend to Northern Ireland. Oil rights grantable only to British subjects or companies incorporated in Britain, with at least one British director and majority of British employees. Only grantable to persons or companies from countries which grant similar reciprocal rights.

**EXPLORATION:** Known as prospecting license. **Area:** 200 sq. mi. No limitation on number per concessionaire. **Duration:** 3 years. Possible extension for two 1-year periods. **Transfer:** Only with government consent. **Bond:** 6 pounds per sq. mi. **Application fee:** 20 pounds per license. **Minimum Annual Payment:** 5 shillings per sq. mile during 1st through 3rd years, 10 shillings during 4th through 10th years, 15 shillings thereafter.

**EXPLOITATION: Area:** 100 sq. mi. No limitation per number held by one concessionaire. **Surrender:** On 18 months' notice for whole license, 6 months' notice for part thereof. **Domestic Consumption:** Consumption in Great Britain and Northern Ireland must be supplied before export may take place. **Duration:** 50 years. One extension of 25 yrs. possible. **Conversion:** Guaranteed. **Royalty:** Minimum 3 shillings per ton of 2,240 pounds, maximum 6 shillings per ton. On natural gasoline, minimum ¼th penny per Imperial gallon; maximum 2 pennies per Imperial gallon. Royalty rates increased 25% during extensions. May be reviewed every 10 years to adjust them to changed prices in Britain. **Minimum Annual Payment:** 1 shilling 3 pence per acre during 1st year—rising to 9 shillings per acre in subsequent years. Deductible from royalties. **Guaranty:** 20 pounds per sq. mi. **Income Tax:** 42½%, plus 27½% profits tax (distributed) plus 2½% (undistributed profits). No depletion. Capital expenditure written off initial allowance, 40%. Dry-hole costs may be written off as one sum. Tax allowances equal to 120% of expenditures allowable on investments since April 6, 1954.

★Source: *World Petroleum Legislation*, 604 Fifth Ave., New York 20, N. Y. (see p's 37-38)

The "tax" on oils of indigenous origin (i.e., the excise duty, as distinct from the import duty which is payable on oils of foreign origin) is, in fact, one shilling and 3 pence per gallon. In both cases, the full rate of duty is payable only on light hydrocarbon oils and on diesel oil for road vehicles. Fuel oils, gas oils, and kerosine are entirely free of duty, while other oils attract a duty of one penny a gallon. END

### UNITED KINGDOM—REFINING AND MARKETING

| | CONSUMPTION 1957 (Half Year Jan.-June incl.) | Year 1956 | FOREIGN TRADE (Thousands of Gallons) Imports 1957 (Jan.-Sept. incl.) | Year 1956 | Exports 1957 (Jan.-Sept. incl.) | Year 1956 |
|---|---|---|---|---|---|---|
| Crude oil (incl. topped crudes and refinery fuel) | | | 5,392,900 | 7,418,643 | | 15,922§ |
| Motor and aviation gasoline | 3,341,057 | 6,771,195 | 574,200 | 627,990* | 327,763 | 443,347 |
| Industrial spirits incl. industrial benzole | 87,837 | 2,291 | | 45,750 | 3,346 | 4,745 |
| White spirit | 75,579 | 133,926 | | | | |
| Burning oil | 382,250 | 771,330 | 316,900 | 386,773** | 44,236 | 57,601 |
| Vaporizing oil | 285,946 | 98,037 | | | | |
| Gas-diesel oil | 1,061,927 | 5,188,849 | 470,600 | 580,859 | 194,110 | 520,954 |
| Fuel oil | 3,180,673 | 10,394,848 | 656,500 | 741,859 | 459,936 | 755,758 |
| Refinery-fuel consumption | 1,022,519 | 2,130,906 | | | | |
| Bitumen Petrolatum | 432,305 | 933,432 | 135,850 | 186,487 cwt. | | |
| Paraffin-wax scale and slack wax | 24,468 | 19,326 | 662,590 | 839,560 cwt. | | |
| Lubricating oils (incl. greases) | 398,039 | 776,385 | 76,900 | 114,208† | 75,761 | 100,045 |
| LPGas | | 66,260 | | | | |
| Miscellaneous products and loss | 855,616‡ | 1,394,478 | | | | |
| Totals | | 28,681,263 | | 10,942,129 | 1,105,152 | |

*Consisted of 627,990 motor spirit & blending components, plus 45,750 other spirits.
**This was given as kerosine.
†Includes "other heavy oils."
‡Includes propane, butane, & other products.
§Crude & partly refined.

### UNITED KINGDOM—PRODUCTION AND DRILLING DATA

| Name of Field | Year Discovered | Number of Pumping Wells (Sept. 1957) | Depth (Feet) | Producing Formation | API Gravity | Production (Barrels Per Day) 1957 (1st 10 Months) | 1956 |
|---|---|---|---|---|---|---|---|
| Caunton | 1943 | 10 | 2,000-2,200 | | 28.0 | 25 | 30 |
| Duke's Woods | 1941 | 108 | 1,800-2,500 | | 33.0 | 540 | 641 |
| Eakring | 1939 | 43 | 1,800-2,500 | Rough Rock | 33.0 | 110 | 144 |
| Egmanton | 1955 | 18 | 3,100-3,400 | | 39.0 | 660 | 159 |
| Formby | 1939 | 10 | 85-130 | | 34.5 | 2 | 2 |
| Kelham Hills | 1941 | 42 | 2,000-2,500 | | 28.0 | 290 | 272 |
| Plungar | 1953 | 6 | 2,800-2,900 | | 31.0 | 58 | 95 |
| Total production b/d | | | | | | 1,685 | 1,343 |

# SPAIN

## PHYSICAL DEVELOPMENT

**Exploration:** Exploration through April 1956 is covered in *World Petroleum Report 1957*. Since that date, three companies have continued active: CAMPSA (the government's marketing company); CIEPSA, associated with C. Deilmann Bergbau, German independent; and Valdebro, a combination of USA private interests and Spanish government interests. The following review covers their activities through November 6, 1957.

*CAMPSA:* Topographical and geological surveys were done of the Zuazo de Cuartango (Alava) structure. Geological studies were at Tafalla (Navarra), Ucera, Nafria, and Aldehuela-La Cuanca (Soria) during 1957. Two wildcats were drilled by the company. They were Leva—1 and Leva—2, both on the Seva (Burgos) structure.

*Leva—1 (CAMPSA No. 9)* bottomed at 1,512 meters. Some light oil was found in sand, but with no gas or pressure, at various levels between 497 and 580 meters in Albian formations running through the Triassic, Jurassic, and part of the Lower Cretaceous.

*Leva—2 (CAMPSA No. 10)* was moved to one side of the same salt dome. On November 7, it had reached 900 meters. Lower Cretaceous was encountered at 509 meters. This well had none of the oil shows observed in Leva—1.

*VALDEBRO:* Geological and geophysical activity has been continued over nearly all the possibly petroliferous areas of the peninsula. Two rigs are running. *Puigreig 1* (Valdebro No. 5) just north of Puigreig (Barcelona) bottomed, August 14, 1956, at 3,192 meters; no shows. Surprisingly, there was no Cretaceous, which has considerable thickness a little farther north.

*Bornos* (Cádiz) (Valdebro No. 6) bottomed, August 28, 1956 at 3,027 meters in Triassic (580 to 3,027 meters). Abnormal thickness of the saline materials of the Keuper prevented exploration of the lower Triassic. No shows were encountered, despite location in area of abundant signs and indications.

*Matienzo* (Santander) (Valdebro No. 7) bottomed, December 23, 1956, at 1,950 meters in Triassic (1,280 to 1,950 meters); no shows.

*Almorchón* (Cadiz) (Valdebro No. 8) bottomed, September 28, 1957, at 3,405 meters in Eocene. Gas was found at various levels from 754 meters. Production tests for gas have not as yet been completed.

*Asperillo* (Huelva) (Valdebro No. 9) bottomed, June 12, 1957, at 3,307 meters in saline and gypsiferous Triassic (2,460 to 3,307 meters); no shows.

*Isla Mayor* (Sevilla) (Valdebro No. 10) bottomed, August 22, 1957. At 2,197 meters, very black ampelitic metamorphic slate began to be encountered in the Paleozoic, where drilling was abandoned at 2,373 meters.

This well is surprising not only for the lack of Cretaceous and Eocene formations between the Miocene and the Paleozoic, but also for the presence of the latter at so high a level in the valley of the Guadalquivir.

*Moguer* (Huelva) (Valdebro No. 11) reached 1,918 meters, November 6, 1957. So far it has intersected Quaternary and Pleistocene (0 to 152), as yet unidentified Tertiary clays and marls (152 to 714), and limestone with argillaceous intercalations (714 to 1,914 meters) assignable to Cretaceous and Jurassic levels. From 1,914 meters on, the well was intersecting levels of massive anhydrite.

*CIESPA:* In collaboration with Deilmann, intensive geological and geophysical campaigns have been carried on by eight geologists and paleontologists and two seismograph crews. Drilling has been as follows:

*Apodaca I* (Alava) (CIEPSA No. 7) bottomed at 2,535 meters in marly facies of the Albion, without shows.

*Alda I* (Navarra) (CIEPSA No. 8) is still drilling. Methane gas was encountered between 2,755 and 2,808 meters.

*Lano I* (Burgos) (CIEPSA No. 10) bottomed, June 1957, at 3,501 meters. It encountered frequent traces of asphalt in limestones above 915 meters, and from that depth on there were some signs of liquid and gaseous hydrocarbons—especially between 1,160 and 1,190 meters—in banks of limestone with low porosity, in the Cenomanian, with cracks showing signs of petroleum. Acidification produced a few liters of crude.

*Trevino I* (Burgos) (CIEPSA No. 10) bottomed at 2,595 meters. It intersected continental Teritary (0 to 1,545) and Triassic (1,545 to 2,595 meters). 1,000 meters of salt were encountered, with some intercalation of compact red clay; no shows.

Several wells of less than 1,000 meters have been drilled in some of the chimneys of the Cantabrian region by the Compania Petrolifera Iberica, with no positive results.

At Benatae (Jaen) an organization, whose purposes had little to do with oil prospecting, drilled a well. Before drilling was started, the presence of oil at 520 meters had been announced. The well was abandoned beyond 460 meters, the latest trustworthy datum. It was early in April when the zone where the find had been expected was reached. Results were negative.

*VALDEBRO ACTIVITIES:* In 1952 Institute of National Industry entered into an exploration agreement with a group headed by General American Oil Co., of Texas. Under the agreement—which INI agreed to advance—50% of the funds in Spanish currency and 50% in dollar exchange by the American group are to be expended in this enterprise. Ownership of the American group has changed from time to time; but, as of December 3, 1957, General American had 52%, DeGolyer and MacNaughton 10%, American Overseas Petroleum Ltd., 9.5%, and Lion Oil, Delta Drilling, Murphy Corp., E. E. Fogelson, and others have lesser interests. DeGolyer and Mac Naughton have furnished geologists, seismologists, and petroleum engineers who function both in Madrid and from Dallas. Delta Drilling has supplied drilling superintendents and other oil-field workers. Precision Instruments Inc. is currently furnishing geophysical personnel. General American takes the general administrative lead in this undertaking.

INI and the Americans work through a commission called Valdebro (an abbreviation for the Spanish for Valley of the Ebro, where the first drilling was done) with five commissioners authorized; but, in practice, only four have been appointed—two by the Spanish and two by the Americans. If commercial oil or gas is found, the operation to develop and produce the discovery will be incorporated with substantially the same ownership as Valdebro: 50% to INI, the same to the Americans, and the same general type of control. Export in dollars of about one-fifth of the production by the American group will be allowed, subject to certain limitations if the volume of production gets to be extraordinarily large.

The first well was drilled to about 11,200 ft. at Marcilla in the Ebro Valley in 1953, with negative results. Thereafter wells were drilled near Soria in central Spain; at San Lorenzo, about 100 miles east of Madrid; at Puigreig, in the extreme northeast; near Burgos, in north-central Spain; near Santander, on the Bay of Biscay; at Bornos, Asperilla, Isla Mayor, Moguer, and Almorchón—the lat-

ter six in the south of Spain. At Almorchón, numerous gas flows were encountered; but, upon thorough testing, they proved noncommercial. To date, Valdebro has drilled more than 100,000 ft. of hole in Spain and spent $7 million, of which INI has contributed 50% in pesetas and the American group 50% in dollars. Expenditures are running about 50% pesetas and 50% dollars.

Valdebro is now using two rigs—a heavy assembly owned by INI, and a lighter rig (about 10,000-ft.) owned by Valdebro. Plans now tentatively made call for the drilling of three deep tests in the south of Spain and seven or more in central and northern Spain. From three to five of these wells can be completed in 1958, depending on difficulty of drilling encountered.

Three seismic crews are now working in various parts of Spain.

Under the current arrangement, Valdebro may explore in any part of Spain which was not covered by a small number of concessions existing in 1952. A new oil law is being considered, and may be adopted soon. Since its provisions in many respects yet remain to be settled, its exact effect on foreign explorations cannot now be predicted. Informally, Valdebro has been assured it will have adequate areas of good promise to explore through the end of the presently projected program, which is expected to continue without interruption.

**Production, Refining, Transportation:** There is no production of crude oil in Spain. Neither are there any pipelines of consequence—the majority of products being transported by tank car and truck through CAMPSA agencies. A 485-mile products pipeline was built from Rota on the southeast coast, diagonally across Spain, to Zaragoza—completed in 1957. It supplies USA air bases. The line is telescoped, including 12-in., 10-in., and 8-in. sections.

A natural-gas line was to be built from the Guadalquivir River valley 800 km to the north, but reserves of gas found so far are probably insufficient to supply it.

Refining capacity in Spain, including the Tenerife refinery on the Spanish-owned Canary Islands, is increasing rapidly. It was enlarged during 1957 by addition to the Escombreras refinery, near Cartagena, of a 25,000 b/d topping unit, an 11,000 b/d Platformer, a $10 million LPGas unit, and outside facilities. The plant is owned by REPESA which, in turn, is owned 24% by Caltex Products Co., 52% by INI, and 24% by CEPSA. Its capacity at present is about 70,000 b/d.

The Tenerife plant owned by CEPSA was expanded by a new 35,000 b/d crude distillation unit installed in 1956 to raise capacity to about 65,000 b/d. CEPSA refined 35,040 b/d of crude in 1956, an increase of 7,100 b/d over 1955. New unloading facilities went into operation at the East Dock of Las Palmas port, with a capacity of 2,000 metric tons per hour.

CEPSA's tanker-fleet tonnage was 65,800 dwt at the beginning of 1957 with addition of the "Albuera," a 19,300 dwt vessel. The company ordered, in 1956, two 32,000 dwt tankers and tugboat. There is considerable activity by the government in production of oil from shale, through Empresa Nacional Calvo Sotelo, a wholly owned subsidiary of Instituto Nacional de Industria (INI), the Spanish government's development bureau. It is principally charged with supervision of the government's plans for three synthetic fuel plants. They include two lignite plants for extraction of about 8,000 b/d of gasoline, lubes, waxes, etc., plus about 100,000 tons per year of byproducts, and one plant based on oil shale. The names of the plants are Escatron, Puentes de Garcia Rodriguez, and Puertollano, respectively.

**SPAIN—REFINERY RUNS***
(Metric Tons)

| | 1956 | 1955 |
|---|---|---|
| Crude throughput at Refineria de Petroleos de Escombreras | 2,158,057 | 2,032,634 |
| **Product output:** | | |
| Gasoline | 416,895 | |
| Kerosine | 47,971 | |
| Tractor fuel | 27,589 | |
| Gas oil | 393,874 | |
| Diesel oil | 51,272 | |
| Fuel oil | 1,042,872 | |
| Butane gas | 444 | |
| | 1,980,920 | |

*Total production of oil products in 1956 was 3,500,000 metric tons—56% from Refineria de Petroleos de Escombreras. The foregoing refining runs are for this refinery alone.

## Oil Law Summary★

*All subsoil rights owned by State. 1952 decree reserves all exploration and development rights to government, except those previously granted.*

**EXPLORATION: Area:** Maximum 2,471 acres per concession. No limit per concessionaire. **Duration:** 3 years. Extendable another 3 years if work performed. **Work Obligation:** Exploration must begin within 6 months of concession granting. **Taxes:** Annual surface tax 3 pesetas per hectare, (about 3 US cents per acre). **Company Ownership:** Foreign participation in petroleum companies limited to maximum 49%. President and board of directors must be Spanish.

**EXPLOITATION:** Conversion from exploration concession not guaranteed. **Duration:** No limit. **Surrender:** Anytime. **Area:** May cover all of exploration area. **Work Obligation:** Operations must begin within 1 year and continue "actively". **Refining Obligation:** Government may require production to be refined within country. **Annual Surface Tax:** 6 pesetas per hectare (about 6.4 US cents per acre). **Royalty:** 5%. **Special Contracts:** Valdebro contract between General American Oil Company and government provides for joint participation.

★Taken from *World Petroleum Legislation*, 604 Fifth Ave., N. Y. 20, N. Y. (see p's 37-38)

Empresa Nacional Calvo Sotelo was established during World War II, and originally was given a budget for construction of about 1.8 billion pesetas (US $45 million at present exchange rates), subsequently increased to about 5 billion pesetas (about US $125 million). The latter sum is a total, not a yearly figure, for the projects listed. Of the amount, about 15% was to go to Puentes de Garcia Rodriguez, 40% to Escatron, and about 45% to Puertollano. Some 3.8 billion pesetas had been spent as of the end of 1956, part of which came from the US aid; but only part of the shale-oil works have been finished, and some thermal power stations established at the three locations designed to operate on lignite and shale oil.

Work on the Escatron and Puentes plants reportedly has been held up pending observation of similar projects in other countries, such as that in South Africa. The two plants are now producing fertilizers only, and attention seems to have been diverted more to producing chemicals than liquid fuels. Escatron's output (planned) has been lowered to about 30,000 tons (from 40,000) of fixed nitrogen, but Puentes' has been raised to 20,000 tons from 12,000 tons. Installation of equipment has begun by a Belgian firm.

Puertollano is now producing around 700 b/d of crude shale oil, retorted from about 500,000 metric tons of oil shale. Although the hydrogenation plant is reported to be functioning normally, gasoline output is still low, and the lubes plant is not yet operating. When complete, the plant will comprise three units —including a crude distillation unit, hydrogenation unit, and refining facilities—to produce around 2,000 b/d liquid fuels (little gasoline and mostly distillates plus some kerosine). Also included in plans are a large fertilizer factory, including a plant of 50,000 tons capacity to be built by a German concern, Badische Anilin and Lurgi Companies.

Like all INI subsidiaries, Calvo Sotelo is expected to pay its own way eventually, and within five years (by 1961) it is expected to be sufficiently established to attract private enterprise to take it over.

### OIL LAWS

During 1957, considerable relaxation of the laws preventing investment by foreign companies was contemplated. A new oil law was drafted, and submitted for passage by December 31, 1957. Its provisions are not yet known; however, the government is interested in stimulating investment by foreign companies, and it is thought to be favorable.

### NATIONAL FACTORS

The attitude of the government toward foreign investment has been restrictive in the past. Foreign participation is limited to 25% in most industries, which may be raised to 49% in special cases. This limitation was exceeded, however, in the Valdebro contract, which provides for 50-50 sharing of ownership between the government and the USA group.

The basic unit of currency is the peseta. It was devalued, April 5, 1957, to 42 pesetas per US dollar, official free rate (2.38 US cents per peseta) for all commercial and financial exchange transactions. There is still a special tourist rate, however, of 46 pesetas per dollar, and a substantial black market which in February went to an all-time high of 56 pesetas per dollar. All investments must be made at the official free rate. Transfer of profits from such investments is possible with permits and at free market rates. Some encouragement of investment is given industries increasing Spanish self-sufficiency or working for national defense; these receive a reduction of 50% to 100% on import duties on machinery imported, and a similar reduction in general taxes. In addition, such companies may be guaranteed a return of 4% on capital invested, provided 50% of profits over 7% be turned over to the government.

The labor situation within Spain is quiet. There are practically no labor unions, and strikes are illegal. The total of labor legislation makes hiring and dismissal of workers cumbersome, and results in an indirect increase to the basic wage rate. Recent data on wage rates are not available, but statistics indicate they are very low.

Taxation of corporate profits in Spain ranges from 16%, when the profits are 4% of capital or less, to 37% when profits exceed 15% of capital. There is also an excess-profits tax ranging from 40% where excess profits represent 10% or less of capital, and graduating to 80% on profits exceeding 60% of capital. There is an 8% tax on dividends when income does not exceed 4% of capital, graduating to 25% when income exceeds 25% of capital. Other taxes are minor. A treaty for avoidance of double taxation with the United States has been proposed. END.

# NETHERLANDS

## PHYSICAL DEVELOPMENT

**Exploration:** Exploration in the Netherlands has continued actively, pushed by the NB Nederlandse Aardolie Maatschappij, owned 50% by Standard Oil Co. (N. J.) and 50% by Royal Dutch-Shell group. This company, which was formed in 1947, has been responsible for all major exploration conducted in the Netherlands to date.

All exploration in the Netherlands is relatively recent. In the first quarter of the century, a number of wells were drilled by the government through its Geological Institute. While drilling these wells, light traces of oil were found in Winterswijka in 1923.

Between 1935 and the end of 1955, about 28,000 gravity observations were made, covering most of the Netherlands. Some seismic work was done by the Germans during the occupation, from 1942 to 1944. In 1947 additional seismic work was begun, and by the end of 1955 about 39,500 seismic observations had been made totaling 6,200 miles.

Between 1937 and 1947, 60 exploration wells were drilled. Of these, two were successful—the discovery wells of the Schoonebeek field. From September 1947 through the end of 1955, 97 exploration wells were drilled, of which 20 have been productive of oil or gas.

In recent years, exploration has been turning westward—away from the Schoonebeek field, which is the major producing field in Holland. Commercial production outside the Schoonebeek field was found for the first time in 1953 at Rijswijk, which now has 10 productive wells, located near the Hague. In 1954, oil also was found in small amounts near the towns of Delft and Berkel—each of which now has three producing wells. In June 1955, oil was found at Pijnacker, which now has five producing wells.

Later, in 1955 and 1956, there were five new finds. There were the De Lier field, which now has seven producing wells; and Wassenaar field, which now has three producing wells. The initial discovery wells at Wassenaar yielded about 600 b/d of 19 API crude from lower Cretaceous at 4,100 ft. Most recent discoveries have been in Ijsselmonde, Ridderkerk, Zoetemeer, Moerkapelle. The Ijsselmonde discovery was on the south bank of the Maas River in western Holland. The discovery well was initially producing about 63 b/d of 18.4 API crude from the Upper Barremian sandstone, which is part of the lower Cretaceous, at 3,100 ft. There are at present 34 productive wells in the western part of Holland. The discoveries in the western section are important because the Schoonebeek field will slowly decline after its present drilling program. All the wells in the West to date have been located in a concession area of 41,140 acres, known as Rijswijk concession. During 1957, this area was extended to 655,000 acres, when NAM's application was granted during April.

Two seismic crews have been operating for NAM—mostly on the mainland, but with one crew carrying out a survey of a possible extension of the western Holland productive trend to the North Sea.

**NETHERLANDS—INLAND CONSUMPTION OF PETROLEUM PRODUCTS**

(Thousands of Metric Tons)

| | 1955 | 1956 | 1957 | 1958 | 1959 | 1960 |
|---|---|---|---|---|---|---|
| | Actual | | | Forecast | | |
| Motor gasoline | 888 | 980 | 1,070 | 1,140 | 1,220 | 1,300 |
| White spirit and industrial spirits | 36 | 39 | 41 | 45 | 48 | 50 |
| Kerosine, jet fuel | 384 | 436 | 462 | 500 | 538 | 576 |
| Gas diesel oil | 1,044 | 1,270 | 1,510 | 1,720 | 1,920 | 2,100 |
| Fuel oil | 1,526 | 1,900 | 2,150 | 2,350 | 2,550 | 2,850 |
| Lubricants | 99 | 103 | 107 | 111 | 115 | 119 |
| Others* | 406 | 440 | 415 | 395 | 425 | 450 |
| Total | 4,383 | 5,168 | 5,755 | 6,261 | 6,816 | 7,445 |

*Including liquefied gas, aviation gasoline, bitumen, paraffin wax, petroleum coke, etc.

Considerable gas has been discovered in the course of exploratory drilling. It was first found in 1948 in a well near Coevorden—now one of Holland's major gas fields. In 1949 and 1950, gas was found at De Wijk, and at Staphorst. In 1951, the Wanneperveen field was found. All these fields are located in Schoonebeek concession area, comprising about 360 square miles.

Another discovery, at Tubbergen in 1951, led to application for a new concession in Overijssel covering about 68 square miles. In 1952, gas was found in Denekamp. It also was found at Rossum and Noordwijk in 1955. During 1956, gas was found at De Lutte, where well No. 5 found gas in the main Zechstein (Permian) dolomite, which is about 3½ miles southeast of the Rossum discovery of 1955. A minor gas discovery was made during 1956 at Ten Boer No. 1, about 4 1/3 miles northeast of Groningen.

**Production:** Production in Holland has risen sharply during the postwar period. In 1945, it was about 6,000 metric tons (120 b/d). This rose, with increasing production from the Schoonebeek field, until 1953. At that time, western Holland began to make its impact felt. Whereas Holland's production figures for the first eight years following World War II were identical with the Schoonebeek field, during 1953 0.4% of the total for the whole country was produced in the West. In 1954, this figure had risen a little higher; in 1955 it had risen to 6%, and in 1956 it rose to over 12%. At present, it is about 19%. This compensates for the decline of the Schoonebeek field which began during 1956. As of September 1957, production in all of Holland was averaging 31,500 b/d.

Oil in Schoonebeek field is produced from about 2,100 ft. to 2,900 ft. downdip from the

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Valanginian formation, which belongs to the lower Cretaceous. The producing formation has a thickness of from 16 ft. to 130 ft., and extends over a total area of about 9½ square miles. Schoonebeek is at present almost fully developed. Crude produced is 25.1 API, paraffin-base, which solidifies at about 55 F. To boost production from this field—which at present is making three times as much salt water as crude oil, or about 10,400 cubic meters of salt water for every 3,900 cubic meters of crude oil or oil emulsion—a large salt-water reinjection program has been started. The procedure is doubly necessary, since the salt water cannot be pumped into any of the farmlands nearby. At present, the water is separated from crude by a system of 18 block stations which are distributed throughout the field. These stations pump eliminated fresh water into disposal wells where it mixes with oil emulsion being carried to a water-purifying plant for treatment by electrical and chemical processes to separate the oil. The salt content of the separated oil is reduced to about 8 grams—well below the refinery's limits. Another type of water injection is carried on by flooding with hot water at a temperature of 220 Celsius. *In situ* combustion also is being used to maximize production from this field.

Discoveries in the western areas of Holland have been in several small anticlinal structures trending northwest-southeast. Oil and gas are present in commercial quantities in the Hauterivian and Valanginian formations which produce in the Rijswijk, Pijnacker, Wassenaar, Ridderkerk, and Zoetemeer fields, and which also produce gas in the Noordwijk field. In the De Lier, Ijsselmonde, Delft, Berkel, and Moerkapelle fields, the Upper Barremian produces oil.

Gas production has become quite important to the Netherlands. Gas is found in commercial quantity in eastern Netherlands, in several gently folded anticlines in the provinces of Overijssel and southern Drente. It is located principally in the following horizons: (1) main Dolomite of the Zechstein formation, which is productive in the Coevorden field in south Drente, and in Tubbergen, Rossum, and De Lutte fields in eastern and northern Overijssel; (2) in the Platy Dolomite of the Zechstein, where it is productive in Tubbergen and in the Denekamp fields in eastern Overijssel.

Natural-gas use and production in Holland are rising rapidly. Production in 1956 was about 75 billion cubic feet, and this is expected to rise within another three years to about 125 billion. Gas reserves at present are estimated to be equal to some 550,000 cubic meters daily production over the next 20 years. Distributed via pipeline system, this gas production is supplemented by refinery gas from the Pernis refinery. Holland's gas pipeline network is expanding rapidly, and an addition made in 1957 from the Caltex refinery in Pernis will supply gas through a line being constructed to Utrecht. NAM is committed to deliver, over the next 20 years, at least 14,125,000 cubic feet daily to the government's pipeline network. (All pipeline facilities are owned by the government for gas distribution.)

**Refining:** Outstanding news in Netherlands refining was the announced plans for construction of a 100,000 b/d refinery by Standard Oil Co. (N. J.). It will be built by Esso Nederland NV, which renegotiated its original refinery-construction contract with the Netherlands government to provide an 86,000 b/d plant instead of the 38,000 b/d plant originally planned. Badger-Comprimo NV, at The Hague, subsidiary of Badger Manufacturing Co., Cambridge, Mass., has been awarded the prime contracts for chemical engineering and construction in accordance with process designs of Esso Research and Engineering Co., in New York. Construction of the refinery will cost about $50 million (florins 175 million). Construction was scheduled to begin early in 1958—with facilities to go onstream during 1960.

Major refinery in the country at present is the NV de Bataafsche Petroleum Mij. (Shell), at Pernis. With crude capacity around 300,000 b/d, it has about 20,000 b/d thermal cracking and 66,000 b/d catalytic cracking capacity. Largest in western Europe, this refinery was increased during 1956 by almost 15%. It also has 10,000 b/d thermal reforming and 12,700 b/d catalytic reforming capacity. Two dehydrosulfurization units—one with 16,000 b/d and the other with 7,800 b/d capacity—are to be completed during the second quarter of 1958. Also under construction is an alkylation plant of 2,800 b/d capacity.

The other existing refinery in Holland is owned by Caltex Petroleum Mij. NV. It is also located in Pernis. Crude capacity is 41,000 b/d—with 9,000 b/d thermal cracking and 6,000 b/d thermal reforming capacity. A UOP Platforming unit and two UOP Unifining units were added to the Caltex refinery during 1957. The 7,500 b/d platformer is producing high-octane gasoline from Arabian stocks. One of the 7,500 b/d Unifining units is designed to treat either Arabian straight-run naphtha or a blend of straight-run and thermally cracked naphthas. The Unifining unit for removal of sulfur and other impurities from diesel fuel is designed to operate on a 4,500 b/d charge of either virgin gas oil or a blend of virgin gas oil and catalytically or thermally cracked gas oil.

During 1957 Esso Research and Engineering Co. announced it was opening a branch office at The Hague to improve administration of technical service for Jersey Standard affiliates in Europe. Initially about 15 engineers will be employed at the Esso office. They will supervise and coordinate some 75 engineers on assignments such as field construction, contractor supervision, inspection and expediting, and start-up in affiliates' refineries. Addition of the new office was called for by the increasing magnitude of refinery construction and operations by Jersey's European affiliates.

Royal Dutch-Shell also maintains a large laboratory in Amsterdam. About 1,750 people are employed, who study new methods of exploration, production, refining, and marketing development. Fundamental research is also carried out. Shell also has a laboratory at Delft, where about 300 persons are employed. They carry out research in the fields of exploration, refining, and production techniques, and management and control.

Runs to stills during the month of August had risen to 1,181,077 metric tons, equivalent to 266,000 b/d. During 1956, runs to stills reached about 230,000 b/d, an increase of 15% over the previous year. END

## Oil Law Summary★

*Subsoil owned by government.*

**EXPLORATION:** No restrictions on exploration, except permission from surface owner. If permission refused authorization may be received from government.

**EXPLOITATION:** Concession grantable only if commercial discovery made. Between discovery and concession grant, temporary permit (permis de vente) may be granted to dispose of production. No limitation on foreign ownership. **Area:** No limitation. **Duration:** No limitation. **Drilling obligation:** None. Work must begin within one year or concession may be cancelled. **Fiscal:** Payments must be made to land owner, ranging from .50 florins per hectare yearly to lump sum payment of 12.50 florins per hectare. No fixed rental payable to government. **Other specifications:** Additional obligations imposed outside governing law of April 21, 1810. These include safety regulations, obligation to furnish reports on production, special "benefit" of 10% net profits earned by company with minimum 1 florin per gross metric ton crude. **Taxes:** Concession is subject to general taxes of country. Profits tax is 40% to 43%. Aggregate taxes payable by concessionaires 46% to 48% oil company profits.

★Source: *World Petroleum Legislation*, 604 Fifth Ave., N. Y. 20, N. Y. (see p's 37-38)

**NETHERLANDS—TOTAL REFINERY OUTPUT***

(Thousands of Metric Tons)

| Products | 1955 Actual | 1956 Actual | 1957 Actual | 1958 Forecast | 1959 Forecast | 1960 Forecast |
|---|---|---|---|---|---|---|
| Motor gasoline | 2,378 | 2,658 | 3,003 | 2,969 | 3,066 | 2,998 |
| White spirit and industrial spirits | 15 | 112 | 112 | 112 | 112 | 112 |
| Kerosine and jet fuel | 732 | 698 | 1,435 | 1,530 | 1,371 | 1,451 |
| Gas diesel oil | 2,671 | 3,632 | 3,622 | 3,506 | 3,343 | 3,333 |
| Fuel oil | 5,303 | 6,350 | 6,430 | 6,159 | 6,067 | 5,828 |
| Lubricants | 68 | 159 | 106 | 110 | 114 | 118 |
| Others | 714 | 724 | 749 | 833 | 922 | 1,031 |
| Total | 11,881 | 14,333 | 15,457 | 15,219 | 14,995 | 14,871 |
| Refinery's own use and losses: | 1,003 | 1,129 | 1,316 | 1,318 | 1,297 | 1,282 |
| Total throughput | 12,884 | 15,462 | 16,773 | 16,537 | 16,292 | 16,153 |

*Including liquefied gas, aviation gasoline, bitumen, paraffin wax, and petroleum coke.

**REFINERIES IN THE NETHERLANDS—1957**

| *Name of Company* | *Plant Location* | *Crude Capacity* | *Type Plant* | *Cracking Capacity* |
|---|---|---|---|---|
| N.V. de Bataafsche Petroleum Mij (Shell) | Pernis[1] | 300,000 | Comp. | 86,000TC |
| Caltex Petroleum Mij. N.V. | Pernis[2] | 41,000 | SC | 9,000T |
| | TOTAL | 341,000 | | 95,000TC |

[1] 10,000 b/d thermal reforming capacity, 20,000 b/d thermal cracking capacity and 66,000 b/d cat. cracking capacity. Cat. reformer 12,700 b/d; two hydrodesulfurizers, 16,400 b/d and 7,800 b/d under construction complete 2nd quarter 1958. Alkylation plant 2,800 b/d projected for completion 1st quarter 1958.

[2] 6,000 b/d thermal reforming capacity. A Platformer and Unifiner under construction; complete 1957.

Capacities are in barrels per day. Key to type of plant: S—skimming; C—cracking; Comp.—complete. Under cracking capacity to indicate type: T—thermal; C—catalytic. All data as of December 1, 1957.

# NORTH AFRICA

ALGERIA
LIBYA
MOROCCO
TUNISIA


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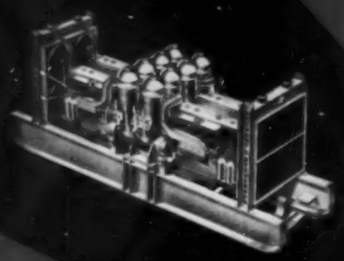

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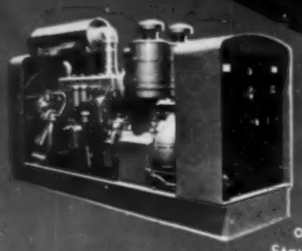

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# NORTH AFRICA

## PHYSICAL DEVELOPMENT

**Exploration:** North Africa has become one of the world's hottest exploration areas, with the discovery of oil in Algeria. By the end of 1957, the French had spent more than $127 million looking for oil in the Sahara Desert, almost $52 million of it in 1957. The French expect France and French overseas territories to fulfill all French oil needs by 1972, with the largest contributor to be the Sahara—where Edjélé will contribute 80,000 b/d, and Hassi Messaoud 100,000 b/d.

Late in 1957, the Bureau de Réchèrches de Pétroles, owned by the French government, stated that foreign participation would be favored in oil exploration in the Sahara if held to a minor interest, and if it supplied its own equipment and technicians. It also specified that French interests must receive at least reciprocal treatment in exploring companies.

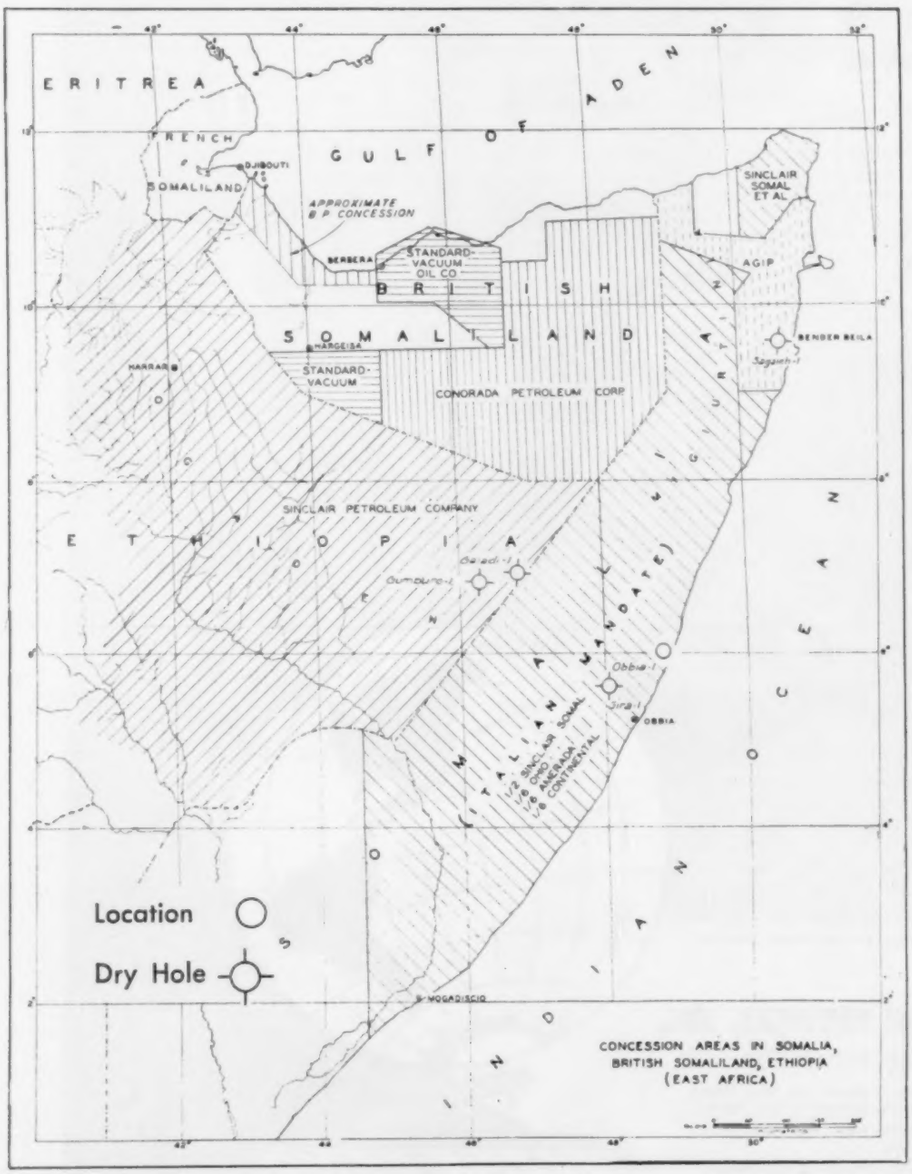
During late 1957 Conorada Petroleum Corp. —owned by Amerada, Ohio Oil, and Continental Oil Companies—received an exploration concession covering 28,000 square kilometers in west-central **Tunisia.** Final approval on the concession has not yet been received; however, the company announced it expects to put two full teams of geologists into the field shortly. They will include photogeologic exploration in the region of Chott el Djerid. Conorada is obligated to spend 1.4 billion francs ($3.3 million) over the next five years on its concession.

The Ste. Nord Africain des Pétroles (SNAP), which had been held 65% by Gulf Oil Corp., gave up its search in 1954. At present only one company is operating in the country, SEREPT (Ste. de Réchèrches et d'Exploitation de Pétroles en Tunisie). This company is owned 70% by the French government and 30% by the Tunisian government. The company has 4 rigs working, and has spent some $28 million during each of 1955 and 1956 on exploration. Oil shows have been obtained recently at Erg Lequine.

The three principal discoveries in Algeria are Hassi Messaoud, Edjélé, and Tiguentourine. Since the French law requires that 50% of exploration acreage be surrendered after a certain period, considerable acreage in this area is now being surrendered, and applications have been made on the area by the countries listed in the Algeria section of this report. There is no doubt that discoveries in Algeria are of major importance. They are especially important to France because of their strategic location and the possibility of deriving oil from more dependable sources than the Middle East.

In **Libya,** the government is pushing exploratory development very rapidly, and a number of new wildcats are drilling.

The government of **Somalia,** a United Na-




## *Tunisia*
## *Oil Law Summary*★

**EXPLORATION:** Companies must be domiciled in Tunisia. **Duration:** 5 years. 3 renewals of 3 years each. If exploitation concession taken, 4 additional renewals possible. **Area:** Maximum 1,000 acres. No limit per concessionaire. Area reduced on first renewal to 80%, reduced to 60% on second renewal, to 50% on third renewal, and to 25% on fourth renewal. **Surrender:** Anytime. **Minimum investment:** Required, varies with each concession.

**EXPLOITATION:** Minimum production of 63 barrels daily at 1,640 feet depth, up to 500 barrels daily at 14,000 feet depth over 6 days test, necessary for conversion. Conversion may then be obligatory. **Duration:** 99 years, plus one or more extensions of 15 years each. **Area:** 386.1 square miles per exploitation concession. No limit per concessionaire. **Royalty:** 10% crude or natural gas. Payable in kind or in cash. **Surrender:** Anytime, in whole or in part. **Transfer:** Not permitted in excess of 51% interest. **Minimum Work Obligation:** Not defined, to be spelled out in concession. **Taxes:** Taxes plus royalty limited to 12½% of value of production, not including direct taxes such as income tax. **Income tax:** Max. 14%. **Dividend tax:** 16%. **National Consumption:** Producer may be required to apply up to 60% of his production to satisfy internal demand of Tunisia. **Depletion Allowance:** None. French companies operating in Tunisia are granted depletion allowance of 27½% of gross income up to 50% of net, reserve so accumulated must be re-invested, however, in exploration or exploitation operations during following 5 years.

★Taken from *World Petroleum Legislation*, 604 Fifth Ave., N. Y. 20, N. Y. (see p's 37-38)

**NORTH AFRICA—CRUDE-OIL PRODUCTION AND RESERVES**

| | Production 1957 (Barrels Per Day) | Reserves (a) (Millions of Barrels) |
|---|---|---|
| Algeria | 300 | 1,000(b) |
| Morocco | 1,600 | 9 |
| Totals | 1,900 | 1,009 |

a Estimated for each country as of the latest data available.
b Estimated by French sources.

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## Morocco
## Oil Law Summary*

*Subsoil reserved to the State. Govt. reserves the right to explore and exploit itself; or to establish national reserves outside of permits presently in force. Also reserves right to buy back any exploration or exploitation concession on payment of indemnity.*

**RECONNAISSANCE:** Permit obtainable with shape and size similar to exploration concession. **Duration:** 1 yr. Possible extension 1 yr. **Taxes:** Initial payment 3,000 francs 1st year, equal payment for extension. Transfer tax 5,000 francs.

**EXPLORATION:** Exploration area derived from reconnaissance permit. All applications must be presented in person at Rabat, not by mail. **Duration:** 3 yrs. One extension of 4 yrs. additional guaranteed. Four more extensions of 4 yrs. each at discretion of govt. **Area:** 4,000 acres. Max. per concessionaire, 62,500 acres. **Transfer and Surrender:** Transfer anytime, but must be of entire permit. Surrender only with govt. permission. **Taxes:** Insurance tax of 15,000 francs. Extension subject to 30,000 francs tax. Tax levied once. **Surface Tax:** To be specified. Reducible with number of permits for which extensions received. If more than 50 permits, tax reduced by ½; if more than 100, reduced by 2/3. **Work and Investment Obligation:** Work program must be presented beginning each year. **Min. Annual Investment:** 250,000 francs ($600).

**EXPLOITATION:** Grantable only to holder of exploration right over same area, but not guaranteed. **Work Obligation:** Must begin within 1 yr. and continue regularly thereafter. **Area:** No max. per concession. Max. per concessionaire 62,500 acres. **Duration:** 50 yrs. One renewal of 25 yrs. at govt. discretion and proof of sufficient work. **Export tax:** 5%. **Issuance Tax:** 180,000 francs per concession ($428). **Extension Tax:** 180,000 francs payable on extension of concession term. **Annual Tax:** 75,000 francs ($178) per concession. **Transfer:** With govt. permission; must cover entire concession. **Surrender:** Anytime, provided obligations fulfilled. **Minimum Investment:** 250,000 francs per year. **Govt. Participation:** Not specified. Is approximately 41% in SCP now operating. **Depletion:** Grantable to French companies engaged in Moroccan operation. 27½% of gross, up to 50% of net. Must be reinvested during following 5 yrs. or it automatically becomes taxable.

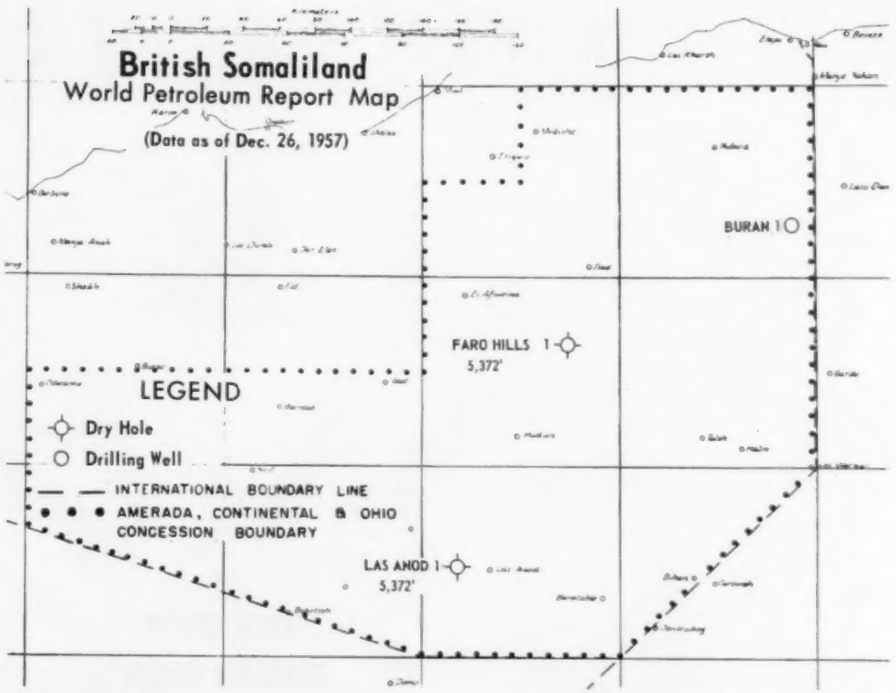
★Taken from *World Petroleum Legislation*, 604 Fifth Ave., N. Y. 20, N. Y. (see p's 37-38)

tions mandate in East Africa, has granted Standard-Vacuum Oil Co. a 10,300-square-mile concession in which the company plans to begin exploring early in 1958. The concession area forms a parallelogram about 50 miles wide which extends approximately 200 miles along the western side of **Somalia,** on the Ethiopian border.

Term of the prospecting permit under the **Somalia** mining law is three years, which may be extended three times for two-year periods. The law provides for a 40-year concession to produce any commercial oil deposits which may be discovered. At the government's option, a 10-year extension may be granted twice.

In Morocco, an exploration concession was reportedly obtained by Mayflower Properties Inc., in Texas; however, this was not confirmed by the government. During the year a wildcat in western Morocco had a promising gas discovery 25 miles east of Mogador. The well was drilled by Ste. Cherifienne des Pétroles. Present oil and gas production is located about 280 miles north of Mogador.

Production is declining slightly, and no discoveries have been made in recent years of importance.



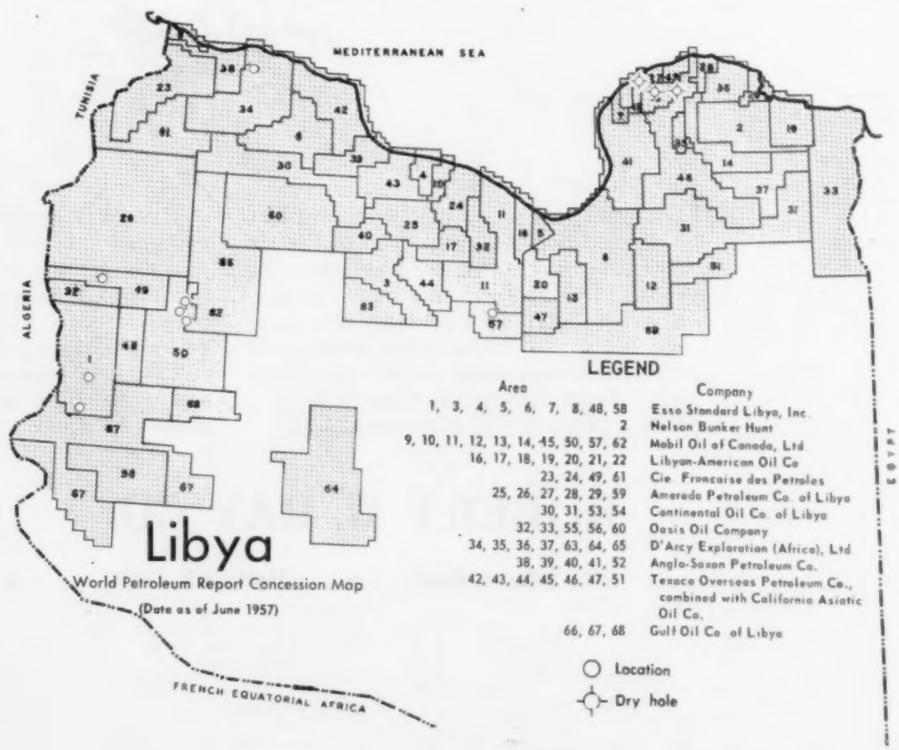

**Production:** Production in Algeria and Morocco—the only two producing areas outside of Egypt's Sinai Peninsula production—continued to decline in 1957. They have not yet been offset by the recent discoveries in the Sahara, and both are pools of very limited size.

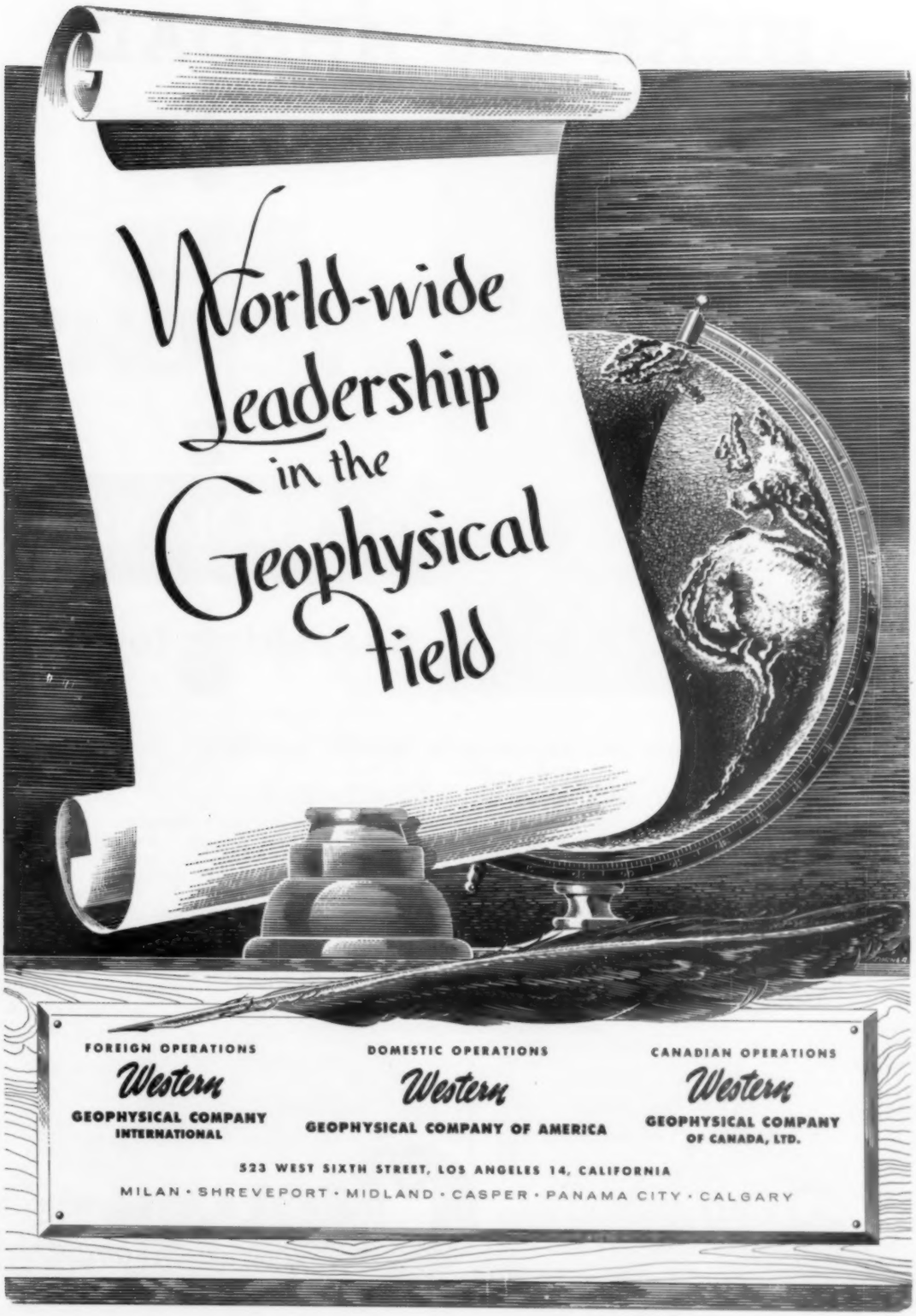
**Refining:** No new projects for refining were reported during 1957, and none are known to be planned during 1958. It is probable that a refinery will be established in Algeria when production there reaches a sufficient level. A refinery was brought to Algeria during 1952; but, when reserves at the Oued Guterini field proved insufficient, it was not assembled.

**Marketing:** Requirements during 1957 were about 75,000 b/d of crude equivalent. This is a decline from 1956 levels, due to the political unrest in the area.

### OIL LAWS

No significant new legislation for oil was passed during 1957, outside of special concession contracts concluded in Egypt. Substantial modifications are under way in the Algerian law, which is now quite vague; but no information on their content is available. END


MEDITERRANEAN SEA
TUNISIA
ALGERIA
EGYPT
FRENCH EQUATORIAL AFRICA
Libya
World Petroleum Report Concession Map
(Date as of June 1957)
LEGEND
Area — Company
1, 3, 4, 5, 6, 7, 8, 48, 58 — Esso Standard Libya, Inc.
2 — Nelson Bunker Hunt
9, 10, 11, 12, 13, 14, 45, 50, 57, 62 — Mobil Oil of Canada, Ltd.
16, 17, 18, 19, 20, 21, 22 — Libyan-American Oil Co.
23, 24, 49, 61 — Cie. Francaise des Petroles
25, 26, 27, 28, 29, 59 — Amerada Petroleum Co. of Libya
30, 31, 53, 54 — Continental Oil Co. of Libya
32, 33, 55, 56, 60 — Oasis Oil Company
34, 35, 36, 37, 63, 64, 65 — D'Arcy Exploration (Africa), Ltd.
38, 39, 40, 41, 52 — Anglo-Saxon Petroleum Co.
42, 43, 44, 45, 46, 47, 51 — Texaco Overseas Petroleum Co., combined with California Asiatic Oil Co.
66, 67, 68 — Gulf Oil Co. of Libya
Location
Dry hole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# ALGERIA

## PHYSICAL DEVELOPMENT

**Exploration:** Algeria's large Sahara region was the scene of intensive exploration activity during 1957, and it is expected to be even more active during 1958. September 24 marked the deadline for applications on the acreage released in north-central Sahara by CFPA and the SN Repal. In queue for the released acreage are six French ventures, among which two have gone into partnership with American independent operators, and one French subsidiary of a British-owned venture.

The applicants are (1) a group composed of the holding company PREPA (30%), FRANCAREP. (20%), and Cities Service (50%); (2) a group composed of SAFREP (27%), the Lazard Bros. Bank (18%), OVIAM (10%), Newmont Mining Corp. (18%), and Sinclair Oil (27%). COFEPA and OMNIREX, holding companies, contemplate partnership with American interests. Soc. Française des Pétroles BP is to be joined later on by French interests. Soc. Nationale de Pétroles d'Aquitaine (SNPA) contemplates partnership with other French ventures, *inter alia*, FRANCAREP and PETROSAREP.

In addition to the acreage released by CFPA and SN Repal, the eastern Sahara will be opened shortly to exploration. Cie. d'Exploitation Pétrolière, holder of the Hassi Tabankort, Téméjidé, Timellouline, and Hassi Imoulaye concessions, has gone into partnership with FRANCAREP (17.5%), EURAFREP (15%), and COPAREX (12.5%). As Cie. d'Exploitation Pétrolière holds a 55% majority interest, it will operate leases on behalf of its partners.

Other companies known to be interested in Saharan exploration include Standard Oil Co. (New Jersey), which has been approached by French companies, Phillips Petroleum, Richfield, Texas Eastern Transmission, Pan American, Canadian Delhi Petroleum, and Edwin W. Pauley. Shell, already represented with 35% interest in CREPS, has been seeking further acreage with the government's Régie Autonome des Pétroles.

Cie. d'Exploration Pétrolière (CEP) has reached agreement with three research and investment firms to help finance work on four eastern Sahara permits. The companies are (with founder members and participation): Worms et Cie. and de Rothschild, 17½%; Eurafrep-Bauque Lazard, Banque de l'Indochine, and Cie. Française du Sahara, 15%; and Coparex-Suez Canal Co., Banque de Paris, 12%. CEP itself will distribute 55% of necessary finance, and will retain control of operations.

Acreage released in January was relatively small—only around 14,000 square miles. Another 8,000 square miles will be released in March, and another 55,000 square miles in May. This may interest companies such as Conorada Petroleum Corp., which was originally looking over acreage in the Sahara along with the French affiliate of Franco-Wyoming Oil Co., the government-controlled Cie. des Pétroles France-Afrique, and Omnirex. Tidewater Oil Co. has also been approached for bids.

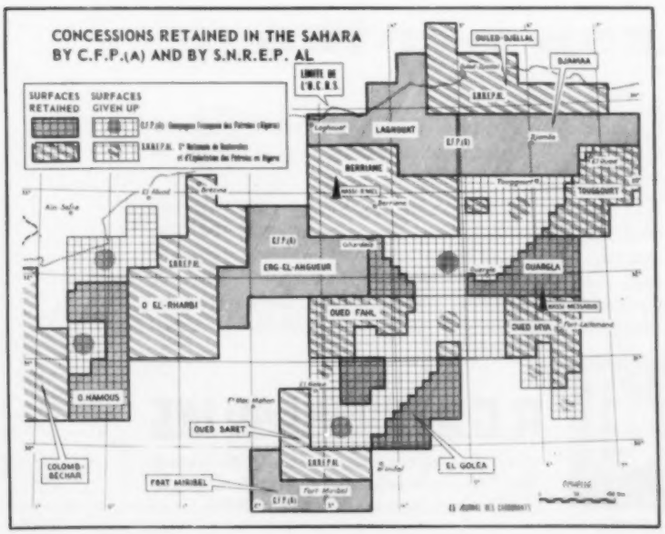
The geology of the Hassi Messaoud is partly stratigraphic, and partly surface. It is a good field, however, and the Hassi R'Mel condensate field will probably also turn out to be a good oil field. There are at least two good prospects farther south which also have potential.

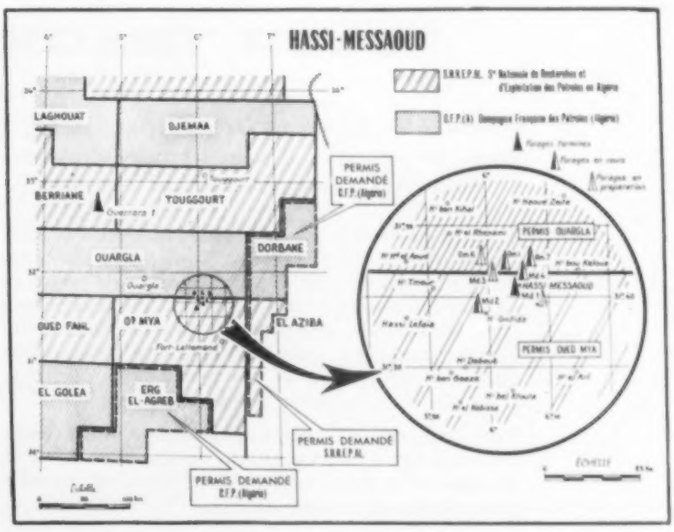
The Hassi Messaoud discovery was made late in 1956. The well encountered, at 10,925 ft., a bed of Triassic sandstone ("Visean," corresponding to Mississippian sands) with about 459 ft. of pay. The well is capable of 1,800 to 2,500 b/d production of light-gravity crude. The second well, MD-2, 6.6 miles west-southwest, hit the same pay at about 11,024 ft. A third extension, MD-3, 2.7 miles northwest of the discovery, has apparently not been reported on. OM-I, five miles north of the discovery well, hit the pay at 10,039 ft., and reportedly flowed about 3,000 b/d.

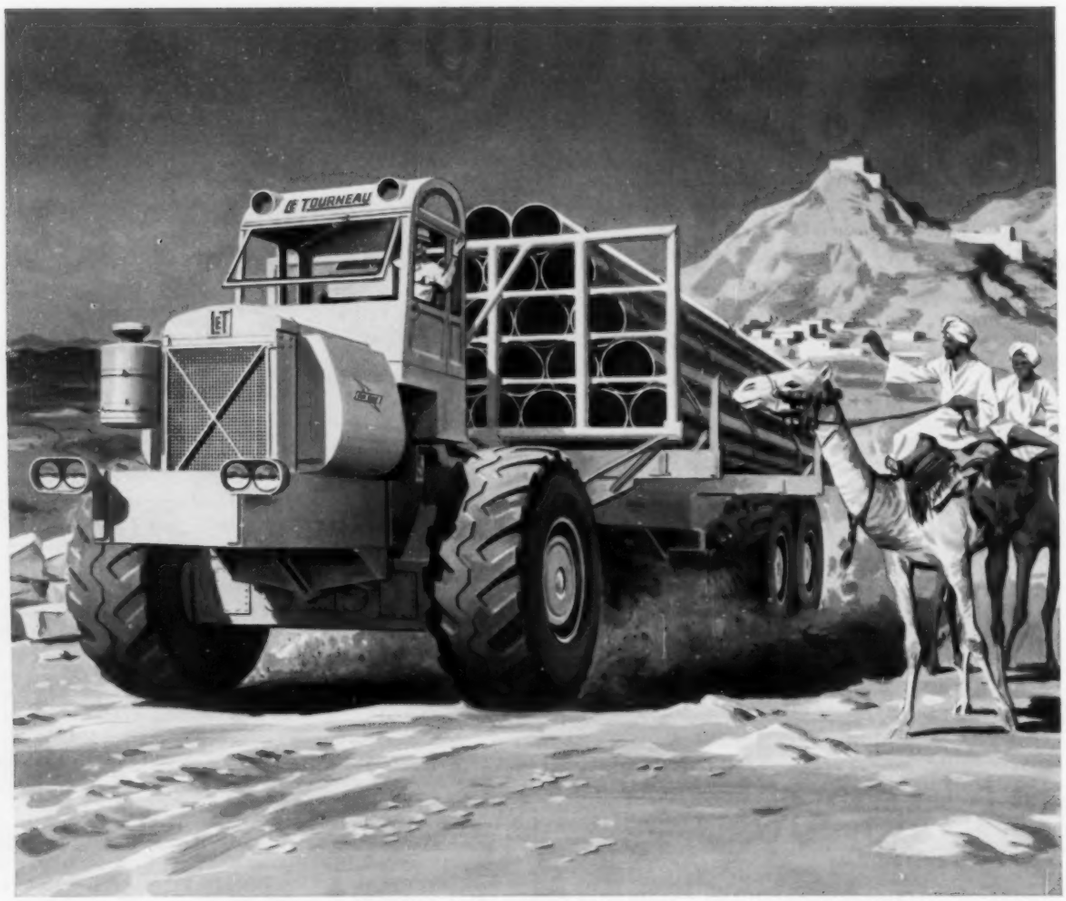
OM 7, five miles east of OM I on CFPA's Ouargla permit, encountered the same producing formation in the quartzite series of the Triassic as did the other three field producers. It flowed 20,420 bbls. (6,800 b/d) over three days, according to reports. A fifth well is drilling on SN Repal's adjoining Oued Mya permit. 2.5 miles northeast of MD I, MD 4 has been drilled (as of about beginning December, 1957) to below 11,035 ft. and is being tested, following "promising" oil shows. Two more wells were drilling in December, MD 3 at 2.5 miles northwest of MD I, below 7,600 ft., and OM 6, 5 miles west of OMI, below 8,000 ft. at last report. These will help in determining the field's boundaries. About 60 wells will be necessary, according to reports, to produce 90,000 to 100,000 b/d. A refinery on the spot will process about one-fifth of production.

A second discovery was made at Hassi R'Mel, about 120 miles northwest of Hassi Messaoud. Hassi R'Mel 1 was suspended with high-pressure gas troubles. About 8.4 miles west-southwest, Hassi R'Mel 2 bottomed in the Ordovician at 7,570 ft. after having found 157 ft. of the same Triassic section. It is evidently a major wet-gas find, and perhaps a major crude find as well. Tests indicate bottom-hole pressure was 300 kg per sq cm; gasoline content 170 to 180 grams per cubic meter.

The first discovery in Algeria occurred during late 1955, when Edjele No. 101, a wildcat well by Cie. de Réchèrches et d'Exploitation de Pétrole au Sahara (CREPS), found oil and gas shows at 1,600 ft. in clay and sandstone, gas shows at 2,156 ft., and produced about 500 to 670 b/d from 1,378 ft. to 1,476 ft. Production was of 35 API crude, with a low sulfur content. The Edjele well was located only about 6 miles from the border of Libya and 280 miles east of Fort Flatters. A number of offset wells of about 1,300 b/d production have been



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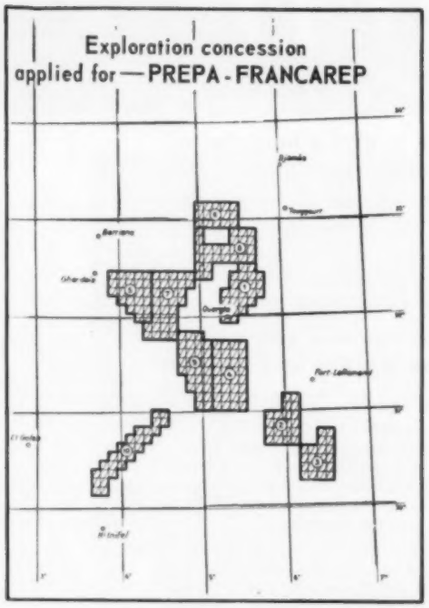



drilled. If the Edjélé field requires intensive drilling and close spacing, as appears may be the case, its potential value will be greatly reduced.

CREPS is owned 35% by the Shell group, the remainder by French government companies.

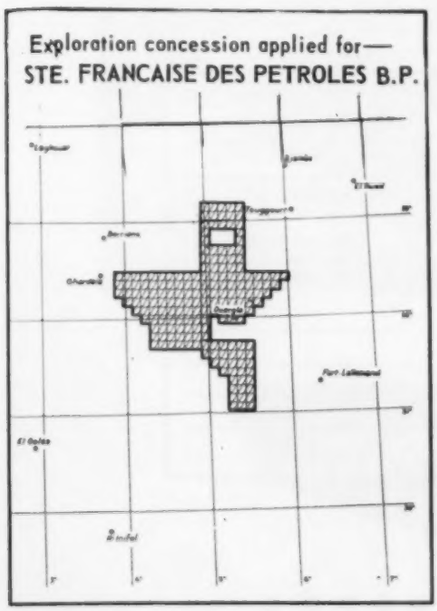
This discovery was followed by another at Tiguentourine, about 43 miles west of Edjele No. 101, which is now producing a reported 670 b/d 35 API crude from the lower Visean sands of the Carboniferous at 1,709 ft. to 1,757 ft.

**Production:** The only producing field in Algeria—at least until the recent discoveries came in—is the Oued Gueterini field, discovered in 1949. It has declined rapidly. Crude production in October 1957 was 165 b/d, down 77.7% from October 1956. The 1st 10 months' production was down 58.8% (to 301 b/d) compared with same period in 1956. The field produces from 1,100 ft. to 1,600 ft. Production is 38.9 API. There are 1,900 proved acres in the field. **Transportation:** SN REPAL company has estimated Hassi Messaoud reserves at about one billion barrels. To extract these reserves, a small 6-in. pipeline has been laid from the discovery to railhead at Touggourt. The contractor is known as GREP. The line, aboveground and not wrapped, is scarcely economic, but supplies of oil to the railhead at Touggourt can be taken from there in tank cars to Philippeville. A major line is planned later. It will be part of a budgeted $105 million during the 1958-60 period for transportation and development. Meanwhile a 135-mile standard-gauge railroad is being built between Biskra and Touggourt, supplementing the narrow-gauge which is now in use.

There are two possible routes for the new pipelines now being built. One is from Edjele and Tiguentourine to Hassi Messaoud and straight up to the port of Philippeville. The other route goes from Edjele and Tigentourine through Tunisia to the port of Gabes or to the Libyan port of Tripoli. The possibility of sabotage exists on the Algerian line; but an all-Algerian route is the probable French choice, since at least it would not be at the mercy of another government.

A project of "prime importance" to Algeria is the planned construction of a gas pipeline from the Hassi R'Mel area—80 kilometers south of Laghouat—to Affreville. The line is to branch out, one section going to Oran and the other to Algiers. EGA, the government-owned electrical and gas utility, estimates that by 1960 the gas will be used to generate all electrical energy in Algeria and to meet the needs of gas consumers for cooking and heating.

**Refining:** A refinery is planned by the French government for construction at Philippeville when the pipeline is complete. Capacity is not yet known. There is presently no refinery in Algeria.




## Oil Law Summary★

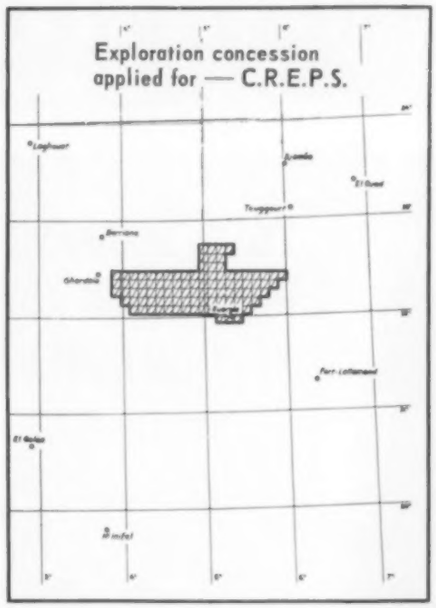
**EXPLORATION: Duration:** Maximum 15 years, inc. 5 years initial duration and 2 extensions of 5 years each. Area reduced 50% on 1st extension, 25% on 2d extension. **Area:** No maximum specified. **Taxes:** None. **Minimum Expenditure:** Required, not spelled out. In past set at about $150/sq. mile initially, $300/sq. mile during extensions. **Transfer:** With government consent only. **Surrender:** Any time. **Ownership:** Grantable only to companies incorporated in France admitting French (usually govt.) participation. Amount not specified. **Drilling Obligation:** Not specified.

**EXPLOITATION: Duration:** 50 years maximum. **Conversion from Exploration:** Guaranteed, if production found. **Area:** No maximum. May extend outside limits exploration right if on structure. **Taxes:** Not specified, will be contained in concession "Cahier des Charges." **Royalty:** Not specified. Now being discussed. **Depletion:** 27% gross income up to 50% net income free from tax. Money so accumulated must be re-invested in exploration within 5 years, or re-invested in other companies exploring in French Union. **Refining Obligation:** None specified. **Surrender:** Voluntary, any time. **Transfer:** With govt. permission only. **Subsoil:** All owned by State, no private rights.

★Taken from *World Petroleum Legislation*, 604 Fifth Ave., N. Y. 20, N. Y. (see p. 37-38)

### OIL LAWS

The Algerian law, as given in the accompanying summary, is still being developed—with changes in the royalty rates currently under discussion. It calls, in practice, for substantial participation by the French government, and to date preference has been given to the smaller foreign companies rather than the majors.

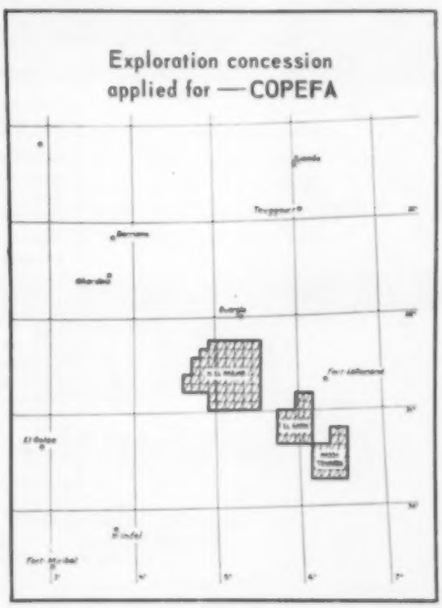



### NATIONAL FACTORS

The principal factor affecting investment favorability is the political situation. The current political unrest has its roots deep in economic expansion and population pressures, and will be long-lasting. The French, however, insist Algeria should be regarded as "another Texas," and as an integral part of France. There is no intention of abandoning the struggle there, although it is extremely expensive to the government.

During 1957, an oil seismic party was attacked and several of the crew were killed by the rebels. However, these attacks will probably not become serious because the French have considerable military strength in the area, and the terrain is very open and difficult for a rebel force to approach unobserved.

END



# DOES specialized BUSINESS PUBLICATION ADVERTISING HELP SALESMEN?

**No one is in a better position to give a hard-boiled, practical answer to this question than the men who spend their working lives on the sales front... the men the ads are supposed to help... the men who sell.**

**Here is the statement of a salesman who knows what advertising does for him when it appears in the industrial, trade or professional publications that serve the specialized markets to which he sells:**

**says Mr. Hegarty:** "I sell semiconductors and other components to original equipment manufacturers in the electronics field. With the tremendous expansion in the electronic industry today, one of our problems is prompt coverage of the market when a new or improved device is announced. I can contact all my larger accounts within a few days, but it takes considerable time to cover the many smaller accounts.

"That's one of the reasons I think our advertising in business publications is so important. It covers all my prospects, large and small, and gets the story of our products to all three groups that can influence purchases—the engineers, the purchasing agents and top management. In some accounts 50 or 60 engineers will attend a meeting. However, there are still many decision-making personnel who can't attend because of other demands on their time. But I know that they will get our story from our advertising.

"On cold calls, many times my selling effort is greatly assisted by the 'pre-selling' of our advertising and it seems to me that advertising often gets me an entree at a higher level than I can usually get on cold calls.

"It helps in other ways, too. For instance, we get inquiries for applications and devices that haven't been developed by our company. Prospects read the advertising, get clues, then contact us. In one case we ran an ad that basically showed a specification sheet on a new component. On one inquiry I followed up, the engineer had the magazine open on his desk right at our ad. He asked me, 'Can you meet this spec?' It was different—but, by some specialized design work, something we could do. I secured a first release order for over $70,000 just from this one inquiry.

"While my division of our corporation had first established its name in the industry on the basis of its work in semiconductors, we also manufacture many other components. They are in competition with units of companies longer established than we are. Here our advertising helps establish our name as a progressive company with a dependable reputation, good to deal with."

Jack Hegarty
Texas Instruments
Incorporated
**sells to industry**

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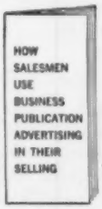
**How salesmen use their companies' advertising to get more business**

Here's a useful package of ideas for the sales manager, advertising manager or agency man who would like to get more horsepower out of his advertising. Send for a free copy of the pocket size booklet which reports the successful methods employed by eleven salesmen who tell how they get more value out of their companies' business publication advertising.




You can be sure that more of your salesmen will use your advertising after they read how others get business through these simple methods.

The coupon is for your convenience in sending for your free copy.

**NATIONAL BUSINESS PUBLICATIONS, INC.**

NBP

**...each of which serves a specialized market in a specific industry, trade or profession.**

NATIONAL BUSINESS PUBLICATIONS, INC.
Department 12D
1413 K Street, N. W.
Washington 5, D. C. STerling 3-7533
Please send me a free copy of the NBP booklet "How Salesmen Use Business Publication Advertising in Their Selling."

Name _____

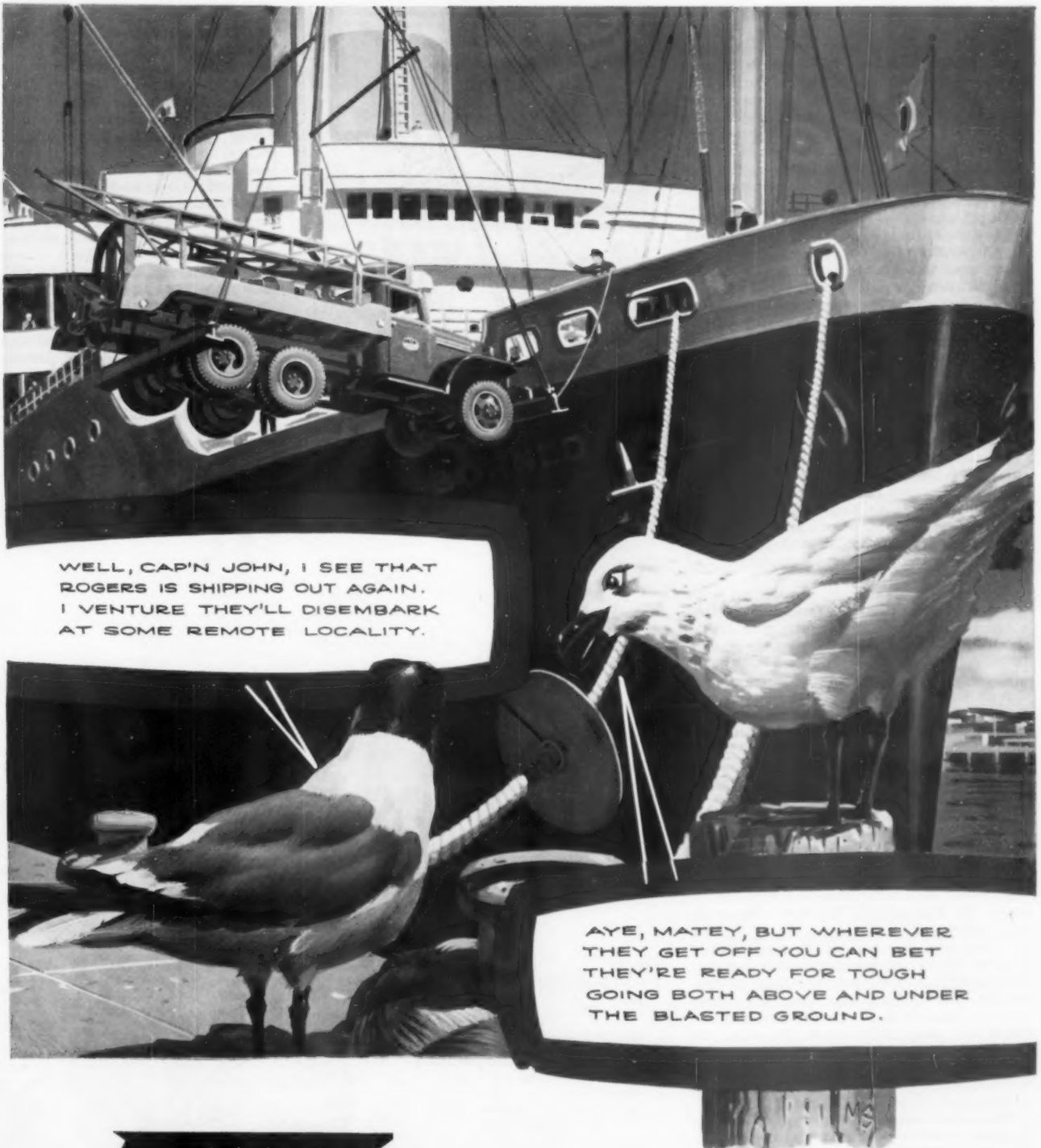
Title _____

Company _____

Street Address _____

City _____ Zone _____ State _____

# CENTRAL & SOUTH AFRICA


WELL, CAP'N JOHN, I SEE THAT ROGERS IS SHIPPING OUT AGAIN. I VENTURE THEY'LL DISEMBARK AT SOME REMOTE LOCALITY.
AYE, MATEY, BUT WHEREVER THEY GET OFF YOU CAN BET THEY'RE READY FOR TOUGH GOING BOTH ABOVE AND UNDER THE BLASTED GROUND.

**IRogers** *Geophysical Company*

**3616 WEST ALABAMA • HOUSTON, TEXAS**

[redacted] Edificio Republica, Caracas, Venezuela · Mogadiscio, Italian Somaliland · 34 Ave. des Champs Elysees, Paris, France

**ROGERS' CREWS GO EVERYWHERE**

# CENTRAL & SOUTH AFRICA

## PHYSICAL DEVELOPMENT

**Angola:** Since discovery of oil by Petrofina several years ago, considerable interest has been shown. It was announced during 1957 that Gulf Oil Corp. received a concession over the Cabinda region. Gulf agreed to spend about $60 million on an exploration program over the next five years. The province of Angola will have 20% interest in the company, and will share profits equally with Gulf, according to press reports.

Gulf's concession application was published in the *Official Bulletin of Angola*, July 31, 1957. It provides a three-year exploration period, which may be extended by two years. During the first three years minimum expenditures is 6,800,000 escudos. The concession is partly offshore. In the event of discovery, Gulf will be given a 50-year concession, extendible for 20 years more.

Petrofina has continued developing its discovery of two years ago. Recent results in Luanda No. 3 well indicate it is a good producer, and that 12 more wells will be drilled in the area. In accordance with Petrofina's agreement with the government, a producing company is being formed, owned 33 1/3% each by the government and Petrofina—with Petrofina's local subsidiary, Lobita Purifina, to hold 11 2/3% and a similar proportion available for subscription by the public. Profits are to be divided equally between the government and the company.

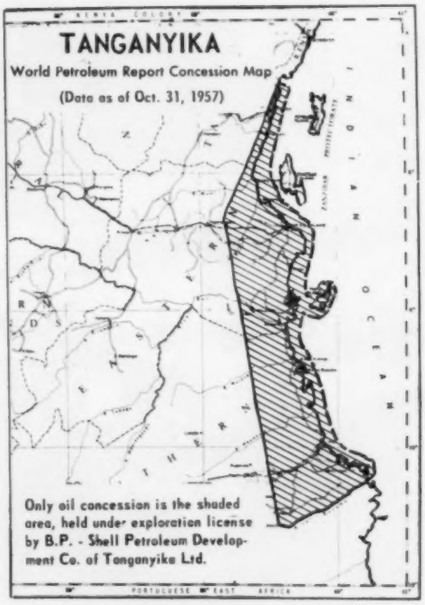
Petrofina now is drilling two wildcat wells —one at the mouth of the Cuanza River, and a second just north of Calumbo. The first is south of the Bemfica field. This is in Cuanza Horte district.

Three seismic crews are investigating Cuanza Sul area, bounded by the Cuanza and Mongaiche Rivers and the Atlantic coast. Production wells are being sunk in both strata of the Luanda field in Guanza Norte. Petrofina has bought part of an Italian refinery which is being erected by Constructora Moderna, a Portuguese firm.

The plant, located on Luanda Bay, just north of the city, is expected to be completed in February 1958. Storage tanks are to be completed when the topping plant is in operation. Plant capacity is 100,000 tons (20,000 b/d).

**Other:** In **Tanganyika,** BP-Shell Petroleum Development Co. of Tanganyika is drilling its third deep test well at Mandawa, about 15 miles inland and located midway between Kilwa and Lindi on the southern coast of Tanganyika. The company had previously drilled two wells; both of them were dry. One on Mafia Island was taken to 11,051 ft. The other, on Zanzibar, was carried to 14,281 ft. Company currently is running other exploratory parties in Tanganyika, but no decision has been made to drill another well in Zanzibar.

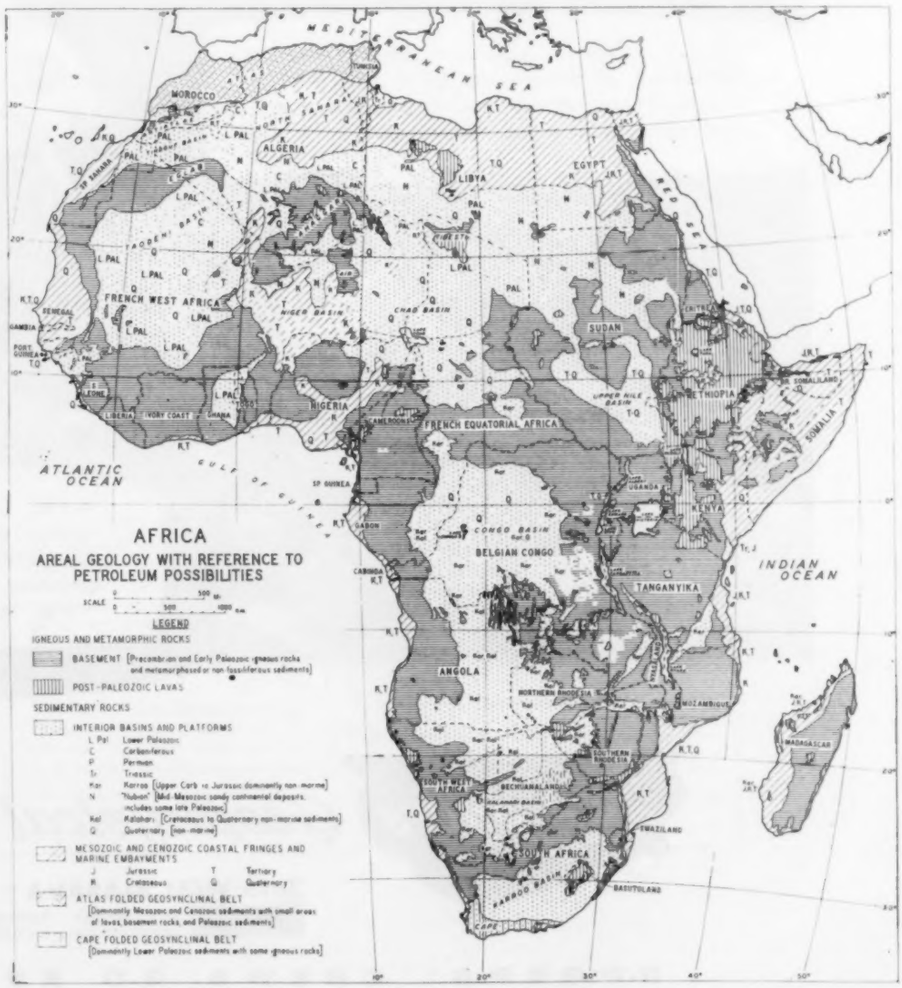
The recent discovery of oil in the **Gabon** is the final stage in a campaign of exploration by Ste. des Pétroles de l'Afrique Equatoriale Française (SPAEF), owned 58.8% by the French government's BRP. So far, three minor pools have been found at Pointe Clairette, Ozouri, and Port Gentil. Production was expected to rise to about 6,000 b/d in December 1957, and to 10,000 b/d in 1958. The first discovery was made by the company in July of 1955 in an interval from 4,174 ft. to 4,207 ft. As of mid-1957, twelve wells had been completed, No. 2 OZ was a dry hole; and No. 3, 6, and 12 OZ encountered salt water. The others produce on the average 63 b/d. Crude is heavy and high in asphalt, similar to Lagunilla's crude in Venezuela. Recently the company found new shows at Animba and Am'Bega.


TANGANYIKA
World Petroleum Report Concession Map
(Data as of Oct. 31, 1957)
Only oil concession is the shaded area, held under exploration license by B.P. - Shell Petroleum Development Co. of Tanganyika Ltd.

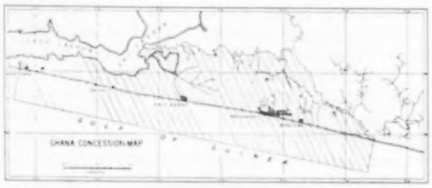
SPAEF began drilling in the middle Congo during 1957, and the first wildcat was a discovery, 300 miles southeast of the company's producing fields in the **Gabon.** The wildcat, No. 1 PI, was drilled at Pointe Indiènne. It found oil-bearing sandstone at 4,442 ft. As of December 1957, six wells had been drilled on it. NB 3, 4, 5, and 6 gave about 42 bbl. per hour from the 2,844-ft. to 2,920-ft. interval in the Eocene. One well, MB-5, flowed 15½ bbl. per hour from 2,763 ft. to 2,796 ft. in the Eocene.

In the **Gabon,** a new test, PG-7, flowed 56 bbl. per hour from 5,036 ft. to 5,101 ft. in Aozouri field. A second offshore well, OZM-2, is to be drilled 1/3rd mile northwest of the first productive offshore well, OZM-1.

**Cameroun:** Three gas wells brought in at Logbaba during 1956 proved disappointing for Ste. de Réchèrches et d'Exploitation des Pétroles du Cameroun. The company revised its estimates to a reserve of only 7.7 billion cubic feet.



Gulf Oil Corp. is drilling its fourth well in **Ghana.** The company has spent about $1.5 million since June 1956. The fourth well is in the western Nzima district. Three previous wells were dry.



Exploration in **French West Africa** is being conducted by Ste. Francaise des Pétroles BP. The company drilled a well in **Senegal** early in February, which went to 6,560 ft.—with no shows. The current test is 14 miles northwest of M'Bour.

On the **Ivory Coast,** Plymouth Oil Co. is negotiating for a half-interest in a 3,700-square-mile permit recently granted to the Ste. Africaine des Pétroles, owned 80% by the French government. The company currently is planning to drill near Dakar. A well at M'Bourouk, some 35 miles east of Dakar, was dry, and abandoned at 13,153 ft. Two wells by SAP were abandoned during 1957. The first, Diam Niadie, was abandoned at 2,132 ft. without encountering the Cretaceous. The second was abandoned in the Cretaceous at 3,379 ft.—with no shows.

In the **Union of South Africa,** several new concessions have been granted. D. J. Harris, of Walvis Bay, Union of South Africa, has been granted a concession, extending from 20 miles south of Walvis Bay to the southern boundary of Swakopmund—including the coastal strip, except for municipal boundaries of the two towns. Five other applications for concessions are being considered.

The Harris concession is understood to be for 12 months. One provision is that prospecting must start in six months; another that 40,000 pounds ($112,000) to 50,000 pounds ($140,000) must be spent in South West Africa in the 12 months. Quarterly progress reports are to be made to the Department of Mines.

Interests representing A. S. Onassis, the shipping owner, are reported conducting core-hole drilling on a concession in **South West Africa.** Republic Oil Co. is also among those granted concessions, according to the *Official Gazette.* Another concessionaire is the firm of K. P. Albrecht & Co., a German financial interest representing Deutsche Erdoel AG, a German concern, and the Belgian company, Cie. Financière Bèlge des Pétroles (Petrofina), which made a recent discovery in Angola. It is reported that German geologists employed by Albrecht have made extensive surveys in the Stampriet area of **South West Africa** during the past three years, and that Albrecht has a considerable quantity of exploratory equipment in Angola and Germany awaiting shipment to **South West Africa.**

Interests in Los Angeles, Calif., are associated with and represent concessionaires holding oil and gas rights to approximately eight million (8,000,000) acres in **South West Africa**—including large areas on the coast as well as in the interior in the Stampriet-Mariental area. END

## REFINERIES IN SOUTH AFRICA—1957

| *Name of Company* | *Plant Location* | *Crude Capacity* | *Type Plant* | *Cracking Capacity* |
|---|---|---|---|---|
| **South Africa:** | | | | |
| So. Africa Torbanite Mining & Refining Co. | Boksburg N. Transvaal | 2,000 | SAC | 2,000T |
| Standard Vacuum Refining Co. of So. Africa Pty. Ltd. | Durban[1] | 18,000 | Comp. | 5,700C |
| | TOTAL | 20,000 | | 7,700TC |

[1] 3,000 b/d thermal reforming capacity.
Capacities are in barrels per day. Key to type of plant: S—skimming; L—lubricating; A—asphalt; C—cracking; Comp.—complete. Under cracking capacity to indicate type: T—thermal; C—catalytic. All data as of December 1, 1957.

### UNION OF SOUTH AFRICA—REFINERY OUTPUT AT STANDARD VACUUM OIL CO.'S REFINERY, 1956

| | Imperial Gallons |
|---|---|
| Regular gasoline | 96,505,710 |
| Premium gasoline | 2,800,175 |
| LPGas | 231,420 |
| Kerosine for illumination | 12,929,455 |
| Kerosine for power | 2,130,765 |
| Cracked kerosine | 34,335 |
| Auto diesel oil | 43,045,590 |
| Industrial diesel oil | 1,432,305 |
| Marine diesel oil | 17,472,630 |
| Bunker fuel oil | 58,075,780 |
| Cutback asphalt | 2,483,390 |
| Paving asphalt | 7,548,135 |
| Rerun bottoms | 6,790 |
| Total | 244,696,480 |

### UNION OF SOUTH AFRICA (AND SOUTHWEST AFRICA)—CONSUMPTION OF OIL PRODUCTS
(Imperial Gallons)

| | 1956 | 1955 |
|---|---|---|
| Aviation gasoline | 9,750,000 | 8,755,000 |
| Motor gasoline | 418,785,000 | 398,675,000 |
| Power kerosine | 91,455,000 | 90,160,000 |
| Illuminating kerosine | 51,050,000 | 48,400,000 |
| Diesel-gas oil | 123,900,000 | 102,315,000 |
| Industrial diesel and furnace oil | 14,225,000 | 14,725,000 |
| Bunker diesel | 42,000,000 | 27,135,000 |
| Bunker fuel | 126,000,000 | 64,275,000 |
| Lubricating oils | 25,350,000 | 24,150,000 |
| Greases | 3,333,333 | 3,163,888 |
| Totals | 905,848,333 | 781,753,888 |

### CENTRAL & SOUTH AFRICA—ESTIMATED CONSUMPTION OF PETROLEUM PRODUCTS
(Crude-Equivalent Basis—Thousands of Barrels Per Day)

| Country | 1957 | % Change 1957 Over 1956 |
|---|---|---|
| British East Africa | 25 | + 8.7 |
| British West Africa | 21 | +17.6 |
| Belgian Congo | 10 | +11.1 |
| Canary Islands | 57 | + 5.5 |
| Ethiopia and Somaliland | 13 | — |
| French West Africa | 38 | +15.1 |
| Portuguese West Africa | 10 | — |
| South Africa | 88 | + 7.3 |
| Others | 30 | — |
| Total Central and South Africa | 292 | +10.9 |

### BRITISH EAST AFRICA—IMPORTS OF OIL PRODUCTS, 1956

| Product | Unit of Quantity | KENYA Quantity | KENYA Value (£1,000) | UGANDA Quantity | UGANDA Value (£1,000) | TANGANYIKA Quantity | TANGANYIKA Value (£1,000) | TOTAL Quantity | TOTAL (£1,000) Value |
|---|---|---|---|---|---|---|---|---|---|
| Aviation gasoline | 1,000 Imp. Gal. | 7,040 | 589 | 1,319 | 107 | 1,122 | 89 | 9,181 | 785 |
| Motor gasoline | 1,000 Imp. Gal. | 39,185 | 1,906 | 18,841 | 885 | 22,866 | 1,074 | 80,892 | 3,865 |
| Power kerosine (not incl. illuminating) | 1,000 Imp. Gal. | 3,555 | 166 | 493 | 23 | 360 | 16 | 4,408 | 205 |
| Lamp oil and white spirit (kerosine, illuminating oil) | 1,000 Imp. Gal. | 7,741 | 374 | 6,103 | 266 | 7,081 | 319 | 20,925 | 959 |
| Gas oil, diesel oil, and other fuel oils | 1,000 Imp. Gal. | 155,899 | 4,978 | 8,852 | 372 | 35,072 | 1,267 | 199,823 | 6,617 |
| Lubricating oils and greases | | | | | | | | | |
| Greases | 1,000 centals of 100 lb. | 15 | 53 | 9 | 37 | 10 | 41 | 34 | 141 |
| Lubricating oils | 1,000 Imp. Gal. | 2,307 | 555 | 910 | 233 | 1,423 | 351 | 4,640 | 1,139 |
| All others | 1,000 Imp. Gal. | 12 | 2 | 8 | 3 | 7 | 2 | 27 | 7 |
| Petroleum asphalt | 1,000 centals of 100 lb. | 326 | 280 | 31 | 24 | 173 | 172 | 530 | 476 |
| Other byproducts | 1,000 centals of 100 lb. | 7 | 16 | 4 | 1 | 4 | 10 | 11.4 | 27 |
| Total Value | | | 8,919 | | 1,951 | | 3,341 | | 14,221 |

*These are readjusted figures, and represent the actual imports into each territory. All Uganda imports and some Tanganyika imports come in through Kenya, but the Kenya figures do not include imports for the other two territories.

## Gabon
## Oil Law Summary*

Gabon is subject to the general French legislation governing Overseas Territories. Oil operations require "personal authorization," discretionary with government and granted for limited duration.

**RECONNAISSANCE: Duration:** 5 years. Renewable one or several times for 5 years each time. **Surrender:** With government consent only. **Area:** Not specified.

**EXPLORATION:** Done under same reconnaissance permit, known as "Permit A." **Duration:** 5 years, renewable one or several times for 5 years each time on completion of obligations. **Drilling:** Permitted. Explorer may dispose of products discovered. **Minimum work:** To be specified in concession, along with minimum investment and other details. **Conversion:** Must request exploitation right on discovery of exploitable field.

**EXPLOITATION:** Two types of concession given. Under exploitation "permit" duration is 4 years. Four renewals may be received each 4 years long if development has been satisfactory and obligations fulfilled. Maximum area, 100 square kilometers—no limit on permits per concessionaire. If discovery is sufficiently important may request conversion of permit to exploitation concession. **Exploitation Concession: Duration:** 75 years. Renewable one or more times for 25 years each on proof of sufficient activity. **Area:** Maximum 2,000 square kilometers (772 square miles). **Taxation/Royalty:** Not yet defined. To be specified in later legislation. **Export:** Must first satisfy local consumption.

★Source: *World Petroleum Legislation*, 604 Fifth Ave., N. Y. 20, N. Y. (see p's 37-38)

# NIGERIA

## PHYSICAL DEVELOPMENT

**Exploration:** Exploration began by Shell-BP Petroleum Development Co. of Nigeria Ltd., owned in equal parts by British Petroleum and Royal Dutch-Shell group since 1937. Expenditure so far has been about 26 million pounds, and discovery has been made at Oloibiri, in southern Nigeria. A second potential field is at Afam, which is more accessible and only about 20 miles east of Port Harcourt. Seven wells have been drilled at Oloibiri, and five at Afam—with two dry at Afam and three at Oloibiri. Drilling is continuing in both places. Shell-BP reported that No. 4 Oloibiri was abandoned as a dry hole at 10,500 ft., and the well plugged and abandoned. This failure seems to prove the southern limit of the field, and drilling is now being transferred to the eastern part of the structure, about two miles to the east of Oloibiri No. 3. There were 4 producers at end of 1957.

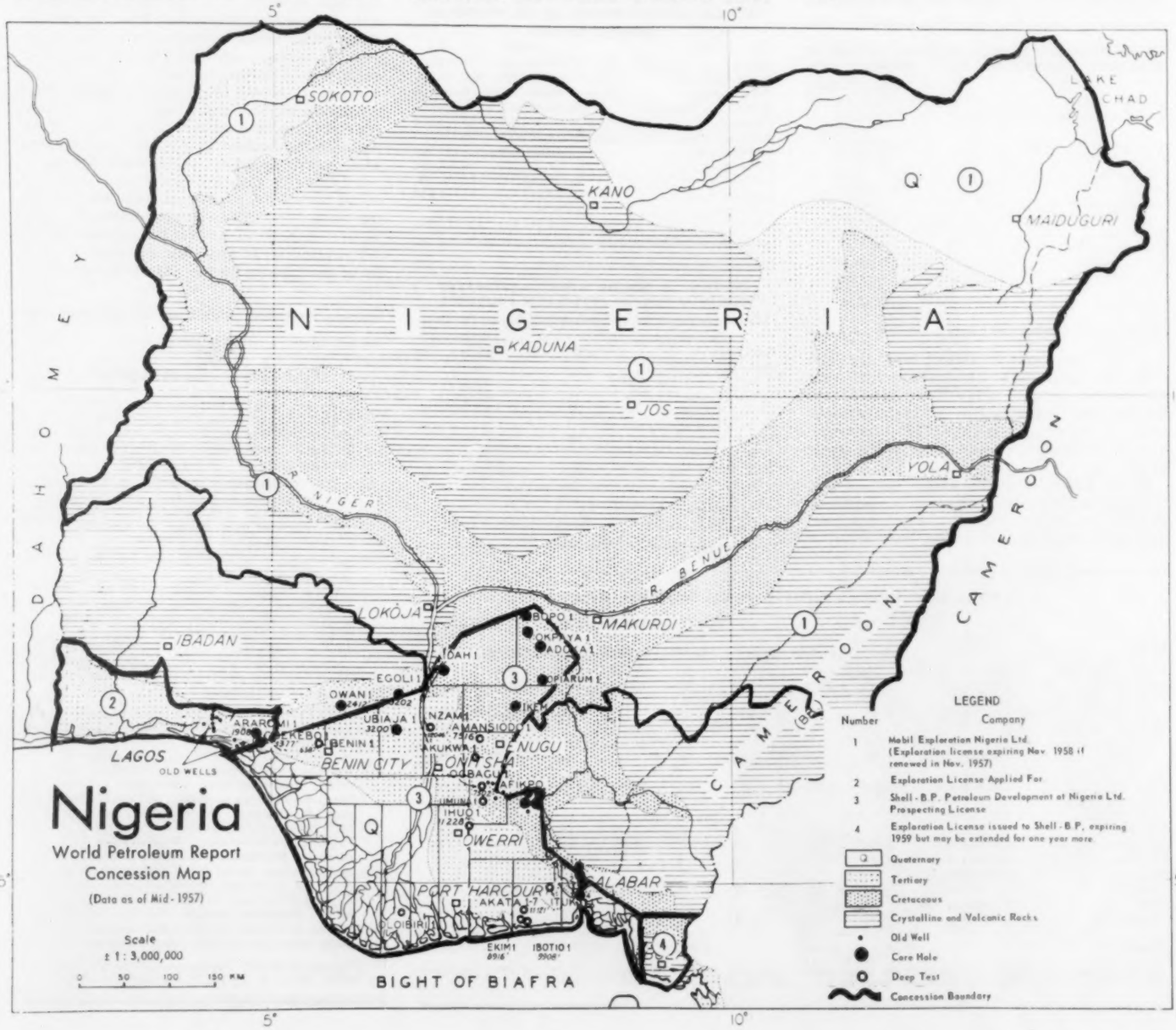
Oil was struck in Afam No. 3 well during mid-1957, about 20 miles east of Port Harcourt. No. 3 is located about ¾ mile south of Afam No. 1, which struck oil at the end of 1956. No. 2 and No. 4 were dry. Encouraged by this success, Shell-BP now plans to drill more wells about two miles west to determine the extent and capacity of this potential field. Afam No. 5 was a producer during December, 1957. In order to determine the productive capacity of the field, a 6-in. pipeline is being laid to Port Harcourt.

The company has decided to take another look at the Benin City area of western Nigeria. A heavy rig is being moved in, 16 miles south. Shell-BP abandoned its last well in the region three years ago after a noncommercial show at 6,387 ft. A fifth rig was received by the company during 1957. It resumed drilling on No. 2 Ituk in eastern Nigeria, which was shut down in 1956 due to mechanical troubles.

Shell-BP ordered its first drilling barge during 1957. The $3.6 million unit will operate in tidal swamps in the Niger delta. These extend from 30 to 40 miles from the coast, and are flooded to a depth of 4 ft. or more at high tide.

The company expects 1,000 b/d eventually from these fields, although production has not as yet been established. A contract has been awarded to Taylor Woodrow (Nigeria) Ltd. for the 465-mile 10-in. pipeline to Port Harcourt. Shell's concession in Nigeria does not extend offshore; however, characteristics of the terrain make offshore equipment necessary much of the time.

Two American companies—including Socony Mobil and Jersey Standard—have shown interest in the area. Socony Mobil has an application covering about 4,000 square miles, which is practically identical with another application by Jersey Standard. Award of the concession has not yet been made. Socony also has considerable holdings in northwestern Nigeria. Seismic work will be done in 1958. A well is reportedly planned, using a heavy rig. END.



# FAR EAST


Clevite offers a flexibility hitherto unknown in magnetic record analyzers

The Clevite Universal Seismic Analog Computer...

enables the geophysicist to extract an unprecedented amount of significant information from field-recorded seismic tapes. And he can do so with greater accuracy and less time lag between tape and mapped results. Moreover, the analog computer technique permits a wider range of electronic inputs.

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In **Formosa**, uncertainty about the island's

Some exploration was done in **New Caledonia**

# FAR EAST

**British Borneo:** Coordinated exploration is carried out in the three territories (and adjoining marine areas) of Sarawak, Brunei, and North Borneo by the three Shell group associated companies: Sarawak Oilfields Ltd., Brunei Shell Petroleum Co. Ltd. (which took over the assets of British Malayan Petroleum Co. Ltd. early in 1957), and Shell Co. of North Borneo Ltd.

During the year, the only exploratory drilling was from two marine platforms, where hopes had been high for new oil-bearing structures, but no oil was found.

From one of these platforms, situated some 21 miles offshore from Seria oil field, Brunei, drillers unexpectedly met with troublesome "heaving shales" at 1,300 ft., and this formation continued down to at least 5,980 ft., when it was decided to plug and abandon the well. The location was described locally as Ampa Patches.

This was the first time "heaving shales" had been encountered in the British Borneo territories. Difficulties had also been experienced in the strata above this plastic formation. The coral-reef and loose-sand formations were extremely porous, and much of the drilling mud was lost into the formation—with the loose sand tending to fill up the hole. The platform at Ampa Patches has now been dismantled. The other platform, referred to locally as the Siwa location, was situated some 8 miles off the coast of Sarawak, about 18 miles direct from Miri oil field. Here two wells were drilled, but both were dry. The first was drilled to 7,680 ft. before abandonment. The second, drilled primarily to obtain further geological information, was deviated to about 5,000 ft. before plugging and abandonment. As a result of these operations, the Siwa platform is also being dismantled.

Meanwhile, Shell Co. of North Borneo was erecting a similar marine platform some 30 miles north of the island of Labuan, at a location described as Hankin Shoal; and a first well is to be drilled there early in 1958.

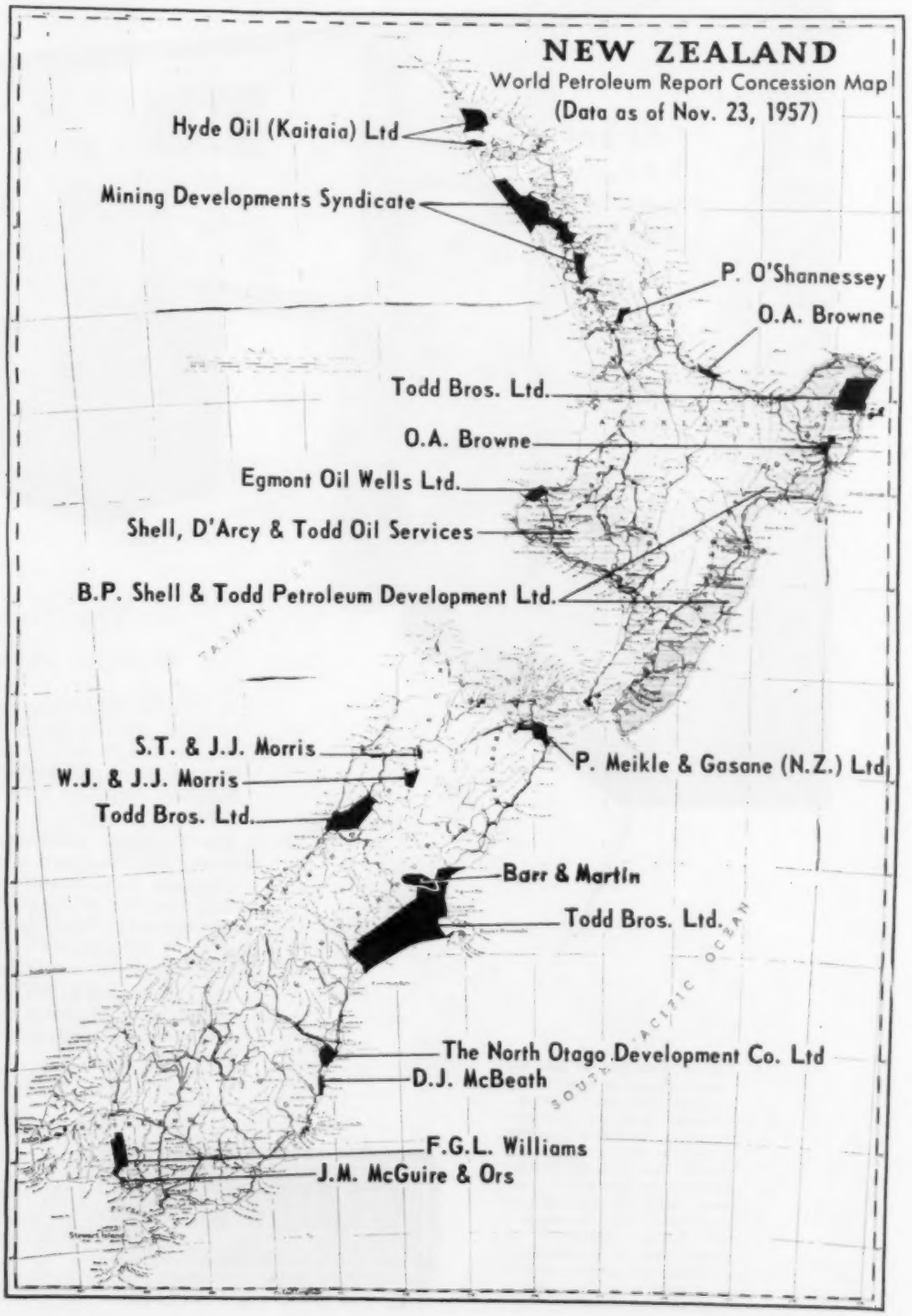
However, the three companies have now decided—on the basis of the results so far—to hire a mobile drilling unit from De Long Corp. The unit will range over the China Sea, carrying out exploratory drilling at all prospective locations. If any oil is found, smaller production platforms will then be erected as the need arises. The erection of fixed platforms for exploratory purposes is not contemplated in the future.

In Seria oil field, a special "deep test" well was drilling towards the end of the year, to penetrate and test formations below the known oil- and gas-producing sands of the field. Because high-pressure gas sands may be encountered, mud-weight control is being given special attention, and special equipment and materials are being used—including high-grade casing. The rig is capable of drilling to 12,000 ft. At the time of this report, the drillers had reached about 8,000 ft.

It was announced in November by Sarawak Oilfields Ltd. that the company proposed to carry out some further drilling in Miri oil field, after a break of over eight years, in order to investigate a high-pressure zone at about 9,000 ft.

It was also announced by SOL, in November, that the company was handing back to the government some 75% of its leases (36,650 square miles) in Sarawak (some of which were not due to expire until 1968) because no evidence of oil had been found after extensive exploration. Only the coastal areas were being retained.

Brunei Shell Petroleum Co. Ltd., the new Shell-group company registered in Brunei at the beginning of the year, now has completely taken over from the British Malayan Petroleum Co. Ltd., which will go into liquidation. Actual transfer of day-to-day business took place, March 15, 1957. It is estimated the new company had drilled 30 wells in 1957, compared with 36 wells drilled by the old company in 1956. Current production from 295 producing wells is 112,000 b/d. In all, 450 wells have been drilled in the Seria field during its life. At present, five drilling strings are in use, and one workover string. Current budget for the year is £3.5 million on exploration and drilling, and £2 million on construction of capital goods.



In **Formosa,** uncertainty about the island's future seems to discourage exploration. Oil production continued to decline—down to about 57 b/d during 1956; and very few exploratory wells were drilled during 1957.

**Philippines** had an additional dry exploratory well during 1957, when Standard Vacuum Oil Co. abandoned its first test in Luzon's Cagayan Valley. No. 1 Faire was abandoned at 10,324 ft. No shows were encountered. The company is now evaluating seismic work. The rig is still in the Philippines, but a second well has not yet been begun.

Philippine Oil Development Co. drilled its second test, No. 2 Tunauini, in the same area, to below 10,500 ft., but abandoned the well—with no shows reported.

Acoje Oil Exploration & Drilling Co. announced during the year it expected to start its first wildcat well in Bogo, Cebu, during December 1957.

**PHILIPPINES—CONSUMPTION OF OIL PRODUCTS**
(In Barrels)

| Product | Full Year 1956 | Jan./Sept. 1957 |
|---|---|---|
| Aviation Gasoline | 277,609 | 221,158 |
| Motor Gasolines | 5,489,825 | 4,353,930 |
| Kerosine | 1,521,057 | 1,164,629 |
| Diesel Fuels | 3,338,471 | 2,853,187 |
| Fuel Oils | 3,390,937 | 2,853,008 |
| Lubes | 275,593 | 191,380 |
| Greases | 50,560 | 34,012 |

Exploration benefited from clarification of several points concerning the oil law. During 1957, documents used between the government and oil firms seeking concessions were forwarded to Washington, D. C., entitled "Petroleum Exploration Concession Contract" and "Petroleum Exploitation Concession Contract." The principal change dealt with extension of concession durations from "may be extendible" to "is extendible." The *force majeure* clause asked by oil firms was not included.

In **New Zealand,** 17 licensees hold 147 petroleum prospecting and mining licenses, covering a total area of 23,548 square miles. No deep tests were drilled during 1957; none are known to be scheduled for 1958. The principal explorer in the country is the Shell-D'Arcy-Todd group which has a 5,574-square-mile concession in the north.

**New Guinea:** No discoveries were made during 1957, and disappointing results from the new field at Seleh, in Vogelkop, have necessitated leaving the field off production, since it is too small to be commercial in its remote location. The operating company, NNGPM (Netherlands New Guinea Petroleum Mij.)—composed of Royal Dutch-Shell, Standard Vacuum Oil Co., and Caltex, on a 40-40-20 basis—continues to search vigorously for oil. It acquired a considerable amount of new concession area—so far without results. The company is employing a new technique, using helicopters to transport drilling equipment into remote locations; this effects considerable savings in time and money. There are presently two wells drilling—with no shows obtained as of December 26, 1957.

**FAR EAST—CRUDE-OIL PRODUCTION AND RESERVES**

| | Production 1957 (Barrels Per Day) | Reserves (a) (Millions of Barrels) |
|---|---|---|
| British Borneo | 116,200 | 550 |
| Burma | 8,900 | 45 |
| China (Communist) | 30,800 | 7,500* |
| India | 9,100 | 300 |
| Indonesia | 314,700 | 3,000 |
| Japan | 6,200 | 25 |
| Pakistan | 6,000 | 22 |
| Totals | 491,900 | 11,442 |

a Estimated for each country as of the latest data available.
* Government estimate.

**REFINERIES AND CAPACITY—FAR EAST**

| Name of Country | Number of Plants | Crude Capacity (Barrels Daily) | Cracking Capacity (Barrels Daily) |
|---|---|---|---|
| Australia | 6 | 204,000 | 56,500C |
| British Borneo | 1 | 50,000 | — |
| Burma | 2 | 6,500 | — |
| China | 4 | 18,000 | — |
| Formosa | 1 | 28,000 | 14,000TC |
| Hawaiian Islands | 1 | 3,000 | — |
| India | 4 | 191,900 | 18,600TC |
| Indonesia | 5 | 230,300 | 44,500T |
| Japan | 22 | 410,300 | 32,800TC |
| Pakistan | 1 | 5,000 | — |
| Philippine Islands | 1 | 13,000 | 5,400C |
| Total Far East | 48 | 1,070,000 | 171,800 |

Under cracking capacity to indicate type: T—Thermal. C—Catalytic.

In **Papua,** three wells are drilling—all with no shows to date. This area had been heavily prospected for many years; and it is expected that, despite very favorable concessions terms, the area will be given up within a year or two if no results are obtained. The only encouraging show has been a gas blowout at Kuru 1, early in 1956. During 1957, three deep tests were drilled—including Komewu, drilled to over 4,150 ft.—with no shows; Komewu No. 2 has been selected for location. Barikewa No. 1 was drilled to below 6,310 ft.—with no shows. Sireru No. 1 was also drilled—with no shows. Plans were being formulated to drill a third test at Kuru in January 1958. The second test at Kuru was abandoned at 7,305 ft. after formation difficulties had been encountered.

**FAR EAST—ESTIMATED CONSUMPTION OF PETROLEUM PRODUCTS**
(Crude-Equivalent Basis—Thousands of Barrels Per Day)

| Country | 1957 | % Change 1957 Over 1956 |
|---|---|---|
| Australia | 185 | + 5.7 |
| Burma | 8 | +14.3 |
| Ceylon | 20 | + 5.3 |
| Formosa | 14 | + 7.7 |
| Hong Kong | 19 | + 5.6 |
| India | 131 | +12.9 |
| Indonesia | 86 | +11.7 |
| Japan | 279 | +14.8 |
| Malaya | 78 | + 4.0 |
| New Zealand | 37 | + 5.7 |
| Pakistan | 37 | + 5.7 |
| Philippines | 45 | + 5.7 |
| Thailand (Siam) | 19 | + 5.6 |
| Viet Nam (Indochina) | 13 | + 8.3 |
| Others | 225 | + 9.8 |
| | 1,196 | + 9.7 |

No. 3 Kuru will be about ½ mile from the other two tests. It will explore formations not reached by No. 2 Kuru. There are big structures apparent in Papua, and seismic work shows good results. It is expected, however, that, if no positive shows are found, within the next few years the company will leave.

Elsewhere in the Far East, exploration is reportedly conducted in **Korea** (North), near Aoji. This area is near the Russian and Manchurian borders. Name of exploring company has not been given.

A Swiss firm is reported to have applied for a concession to explore in eastern **Nepal** on what may be a continuation of the Assam oil-bearing strata.

Some exploration was done in **New Caledonia** by a French company, Ste. Réchèrches et d'Exploitation des Pétroles en Nouvelle Caledonia. No discoveries have been reported in this area, although in mid-January 1955 gas was struck in Gouaro No. 2 well at 506 ft., followed by a show of paraffin-base oil. The shows were encountered in a series known as the Roche Percee Flysche belonging to the lower Eocene. This is the first show of oil within a sedimentary series in this part of the Malaysian Arc. Previous shows have been associated with igneous rocks.

**Refining:** In addition to the countries listed separately in this report which have some refinery construction under way, it was announced in the **Philippines** that Standard Vac-

## *Philippines Oil Law Summary*★

*Subsoil rights reserved to the State, although some private rights exist.*

**RECONNAISSANCE:** Reconnaissance permit available. Drilling not permitted. Initial duration 2 years, renewable once for 2 years more. No taxes payable. Application fee 100 pesos (US $50).

**EXPLORATION: Area:** Maximum 247,104 acres per concession. Maximum per concessionaire, 2,471,040 acres, of which not more than half in one petroleum district. **Duration:** 4 years. Extendible twice for 3 years each time, at government discretion. **Surrender:** Anytime. **Minimum Expenditure:** Rises from 10 US cents per acre during first year to 40 US cents per acre during fourth year. During extensions rises to maximum US $1.20 per acre. **Annual Surface Tax:** 1 US cent per acre during first year, rising to 2 US cents per acre during fourth year. During extensions rises to maximum 2.5 US cents per acre. **Application Fee:** US $500. Returnable if concession not granted. **Bond:** Must be posted, amount not specified. **Customs Duties:** Exemption given on all equipment and material used. **Export Tax:** Guaranteed freedom from export tax on production. **Special Oil Regions:** Country divided into 5 oil regions. All open to concessions. Surrendered concessions obtainable only through competitive bidding. **Corporate Restriction:** Oil companies must have 60% Filipino ownership by Constitution but requirement set aside for Americans.

**EXPLOITATION:** Conversion from exploration, guaranteed. **Area:** Maximum 123,500 acres. Maximum per concessionaire 1,235,000 acres. Maximum per concessionaire per district 617,500 acres. **Duration:** 25 years. Renewable 25 years on application. **Surrender:** Anytime, in whole or part provided amount retained not less than 24,710 acres. **Refining Obligation:** Government may require refinery construction of 10,000 barrels daily when petroleum reserves of concessionaire reach 140,000,000 barrels capable of 10,000 barrels daily production for 15 years. **Annual Surface Tax:** Rises from 10 US cents per acre during first 5 years to US $1.00 per acre during fifth 5-year period and thereafter. **Royalty:** 12½%, in kind or cash. **Refining Concession:** Concessionaire may receive refining concession of 25 years duration, renewable for 25 years. Must begin construction within 1 year of refining concession. May renounce concession without government approval at anytime. **Pipeline Concession:** May receive 25-year concession, renewable for 25 years. Must begin construction within one year. Must transport government oil, and is considered public carrier. May surrender concession anytime unless production from national reserves is concerned, when government approval necessary.

★Taken from *World Petroleum Legislation*, 604 Fifth Ave., N. Y. 20, N. Y. (see p's 37-38)

uum Oil Co. had been granted a permit to build a $33.5 million refinery on the Batan peninsula, which will be the largest private investment project in the Philippines to date. Capacity will be about 25,000 b/d. Completion is scheduled for 1961. Products will include aviation turbo fuel, motor gasoline, kerosine, diesel oils, and fuel oil.

The **South Korean** government is reportedly studying a law to safeguard foreign refining investment. It has invited several oil companies—including Gulf Oil Corp., Standard-Vacuum Oil Co., and Caltex—to consider building the plant.

### OIL LAWS

No significant changes occurred in oil regulations in the Far East during 1957. The principal development, awaited for some time, is revision of the Indonesian oil law to permit increased activity by foreign companies. This was not done during 1957, and probably will not be done until late in 1958 at the earliest.

A new oil law was written in Burma, which is expected to be drafted shortly, and which is considered operable.

One of the major developments in the area was a meeting of the Economic Commission of the United Nations, which is known as Regional ECAFE. The subject of petroleum laws was discussed at a November conference, and the participating countries were asked to submit oil laws presently in force in order to make an attempt at composing a law which would serve all underdeveloped countries of the area. Late in 1957, a comparative study—very detailed—was done by the United Nations. A draft for the composite law which had been submitted was rejected during the year. It is expected that, during the fall of 1958, the subject will be brought up again and some attempt made to find an acceptable compromise law.

### NATIONAL FACTORS

Generally, stability in the Far East continued to decline both economically and politically. While no adverse oil legislation was passed during 1957, the area's general attitude toward foreign investment—and western foreign investment in particular—worsened. The attitude was particularly evident in the December meeting of the Afro-Asian bloc in Egypt, where anti-western sentiments were freely expressed. END

## New Zealand Oil Law Summary★

*All subsoil rights reserved to government.*

**EXPLORATION:** "Prospecting License" includes all exploration activities. **Duration:** Five years. Renewable once for five years. **Area:** 200 sq. miles. No limitation on number of licenses per licensee. **Fees:** Application, 10 shillings, plus 5 shillings for registration, and £1 for license fee. **Deposit:** £1,000 ($2,400) for security. **Drilling Obligation:** Must begin exploration within 3 months, drilling after 3 years. Must continue drilling one well until productive or proved non-commercial. Only one rig required within 100 miles center of license area. **Surface Tax:** 5 shillings (70 US cents) per square mile.

**EXPLOITATION:** Concession grantable only to holder of exploration area. Conversion specifically guaranteed. **Duration:** 42 years. Renewable possible up to 63 years maximum for concession. **Surrender:** Anytime, on six months notice (two months notice for exploration). **Area:** 100 square miles. **Deposit:** 20 lbs. per square mile, minimum 250 lbs. **Annual Surface Tax:** £10 ($24) per square mile. Deductible from royalties. **Royalty:** 5% minimum. Not payable on natural gas not sold. Based on "selling value" as agreed upon between government and operator. **Export:** Subject to government permission. **Refining:** May be required by government. **Transfer:** With government consent only.

★Source: *World Petroleum Legislation*, 604 Fifth Ave., N. Y. 20, N. Y. (see p's 37-38)

## Papua—Oil Law Summary★

**RECONNAISSANCE: Duration:** 12 months. May be extended up to total of 10 years. **Area:** 10,000 square miles. Only one permit per individual or company. Application fee $224. No other tax or rental. Must begin reconnaissance within 6 months, thereafter submit report every 3 months.

**EXPLORATION: Area:** 50% reconnaissance area, or 5,000 square miles maximum. **Duration:** 2 years. May be extended for total duration of 6 years. **Surrender:** Any time in whole or part, on two months' notice. **Application fee:** $45. **Granting fee:** $66. **Bond:** $11,200. **Annual Rental:** 11¢ per square mile during first year, rising to $2.20 per square mile in last year.

**EXPLOITATION: Area:** 50% exploration area, maximum 2,500 square miles. **Duration:** 21 years. May be renewed for successive 21-year terms at government discretion. **Bond:** $22,400. **Drilling Obligation:** Rig installed within 6 months and drilling begun. Must continue to production or depth showing well unsuccessful in government opinion. **Surrender:** On 6 months' notice by concessionaire. **Annual Rental:** $33.60 per square mile during 1-5 years, $67.20 during 6-10 years, $112 per square mile yearly thereafter. **Royalty:** 10% payable on gross value at wellhead for crude, gas, and natural gasoline.

★Source: *World Petroleum Legislation*, 604 Fifth Ave., N. Y. 20, N. Y. (see p's 37-38)

# AUSTRALIA

### PHYSICAL DEVELOPMENT

**Exploration:** No discoveries have been made in Australia despite a very active exploration campaign. About $78 million had been expended to mid-1957. WAPET (Western Australian Petroleum Pty. Ltd.), owned 80% by Caltex and 20% by Ampol, a local company, has spent about $29 million, and recently announced wells will only be undertaken after extensive preliminary work in the future. Well 17B was abandoned dry on Dirk Hartog Island, and the rig brought back. Rough Range No. 10 was also dry.

Location for an exploratory well in the Canning basin has now been selected at Samphire Marsh, about 30 miles southwest of Anna Plains homestead. The well will be drilled to a depth of about 8,000 ft. to 10,000 ft.—the deepest test so far planned by the company in the Canning basin. It may be the first in Western Australia to qualify for the commonwealth government's newly enacted drilling subsidy.

Associated Freney Oil Fields NL announced, May 20, signs of oil and gas in a core taken from its Three Sisters wildcat well in the West Kimberleys. The core was taken at a depth of 8,896 ft. The target formation was Devonian limestones, entered at a depth of about 6,200 ft.

The Three Sisters is located about 120 miles east by south from Derby, on one of the three prospecting license areas held by the Freney interests within the general exploration permit areas granted to WAPET. Freney interests had drilled unsuccessfully on the Nerrima dome and Myroodah license areas.

In **Portuguese Timor,** Timor Oil Ltd. plans a test hole of around 6,000 ft. at Aliambata, where oil seepages are found.

An oil company known as South Pacific Pty. Ltd. has been formed, with Australian and American participating capital, to drill on a 7,000-square-mile concession near Tambo, Queensland. The company will drill one or perhaps two wells in the Tambo area.

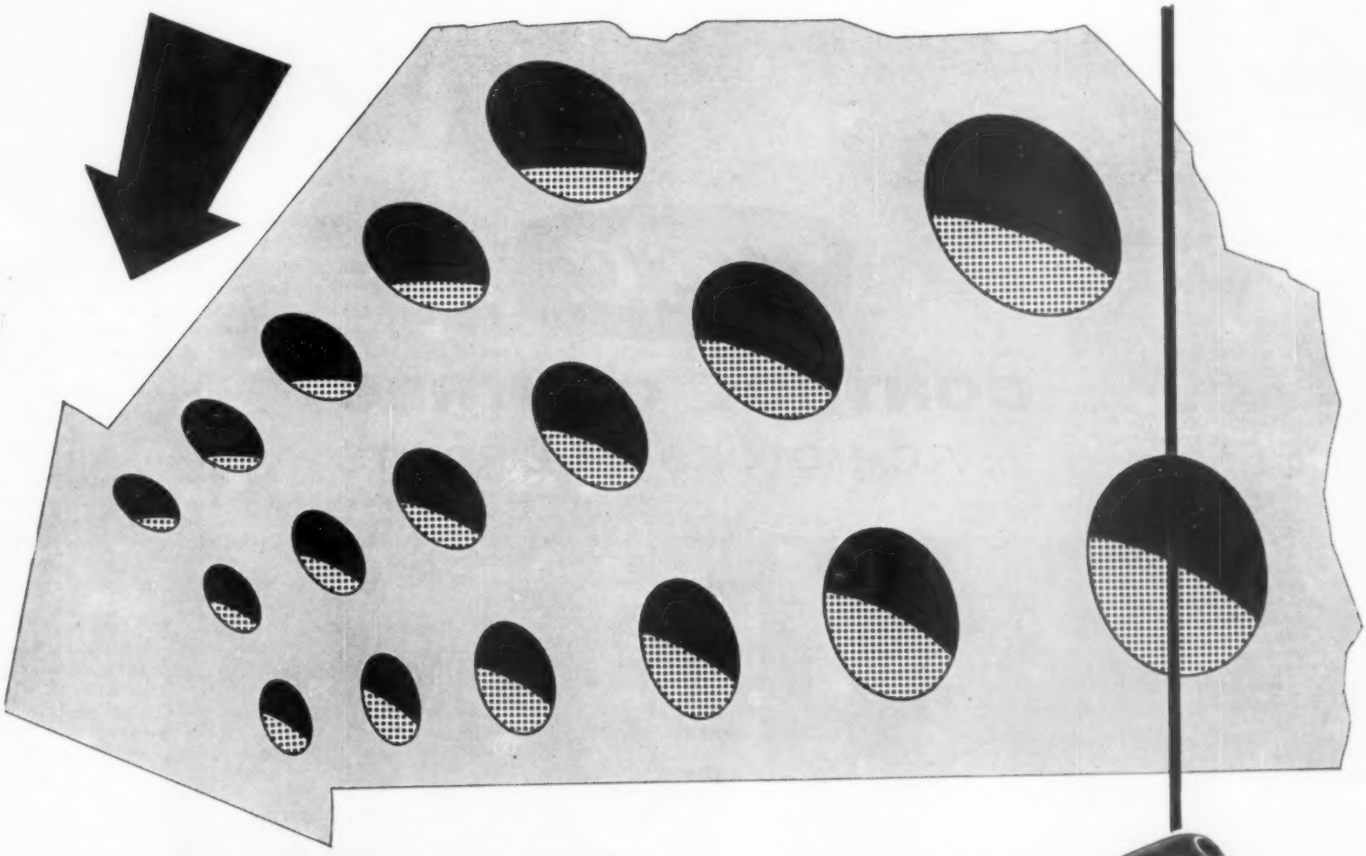
In order to encourage the search for oil, the government has announced it will meet part of the cost of deep stratigraphic drilling—a maximum of half the cost of each hole drilled at approved sites.

Santos Ltd. has obtained shows of oil, and has encouraging prospects in South Australia and Queensland. Delhi Taylor Oil Corp., controlled by Clint Murchinson, is now sending geologists to look over Santos' acreage.

### NATIONAL FACTORS

No change occurred during 1957 which would adversely affect Australian investment favorability. The country continues politically stable. Income taxes were raised, effective July 1, 1957, to 32½% on the first $11,200 for private companies up to 37½% on over $11,200.

Dividend tax is 37½% on dividends received by resident companies. Nonresident companies pay 32½% on income not consisting of dividends on that amount by which the taxable income consisting of dividends is less than $11,200. END



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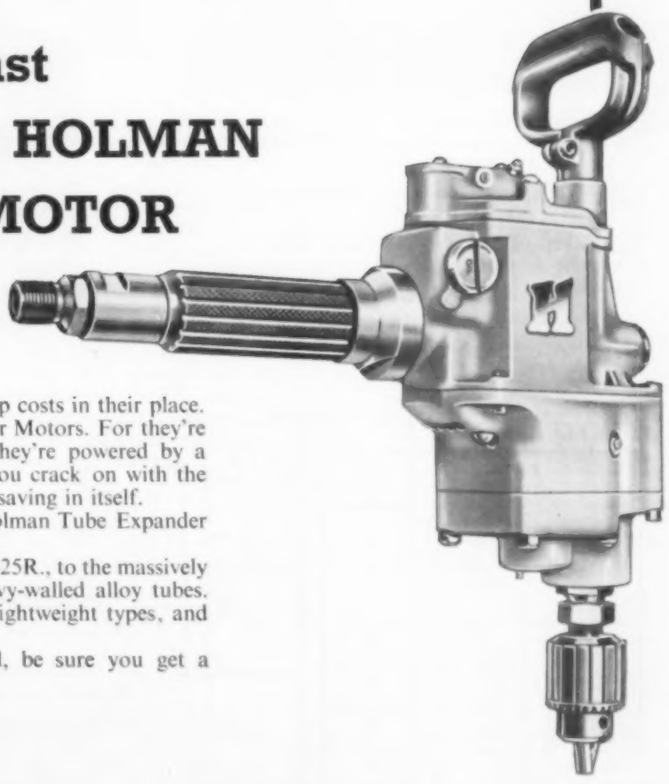

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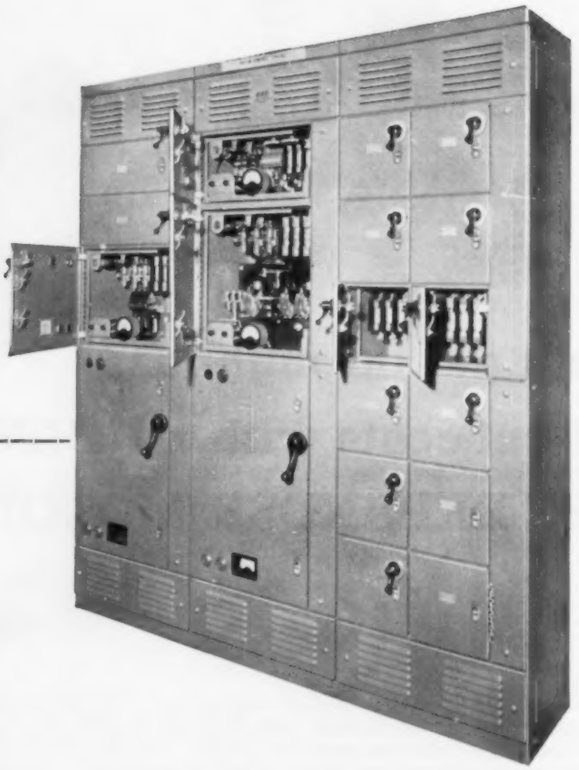

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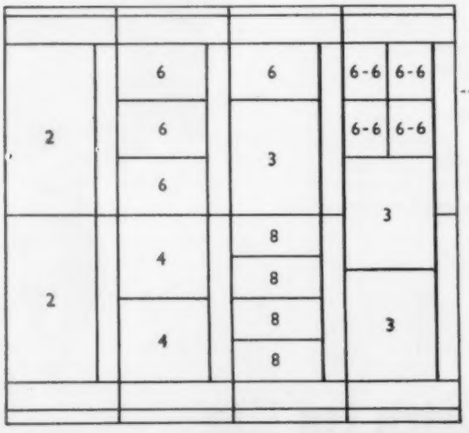


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# INDIA

## PHYSICAL DEVELOPMENT

**Exploration:** Oil exploration has been unusually restricted in India, and at present there are only two companies, Standard Vacuum Oil Co., and Assam Oil Co., actively working—although the government is also active.

Standard Vacuum spudded its first well, Burdwan No. 1 in West Bengal, about 30 miles northwest of Calcutta, April 8, 1957. It was abandoned dry—with no shows—at 8,921 ft., after having hit igneous rock at 8,350 ft. The company spudded a second well, Galsi 1, about 35 miles northwest of Burdwan. It was abandoned at 4,250 ft. late in 1957, and a third well, Jalanzi 1, was begun. As of December 6, it was at about 6,000 ft., and coring. The drilling is fast, as shown by the well's spudding date of November 1.

The government appropriated about $18 million for oil exploration through its Oil and Natural Gas Commission, and with the help of three Russian and Romanian rigs spudded an exploratory well in the Kangra valley, of the Jwalamukhi area in the Punjab, about April, 1957. The crew is Romanian, under a Russian driller, Mr. Zagrabiants. Oil shows were reported during November. Nine locations have been staked out in the Kangra valley—three in Jwalamukhi area and one each in Janauri, Dharamsala, Yol, Nana, Nurpur, and Bhal. Other wells are planned at Cambay, in Bombay, and in the Sigsagar area of Assam, according to press-correspondent reports. During July, a government team arrived in Jammu province to do surface work in the Mansar Lake and Reasi areas.

**Production:** Until a few years ago, production was all from the Digboi field, in the state of Assam, and by Assam Oil Co., a subsidiary of The Burmah Oil Co. In 1953 oil was found at 9,700 ft. at Nahorkatiya, about 20 miles southwest of Digboi. Sixteen wells were capable of producing at the end of 1956; but 10, drilled during the 12 months preceding September 1957, failed to increase reserves—estimated at 2½ million tons (about 18.8 million bbl.) at Nahorkatiya. A discovery was made at Moran in 1956; so far four wells have been completed. The first two were successful, but the 3rd and 4th were dry. A 5th, Moran 5, found commercial production during November 1957, and a 6th well was spudded. The old Digboi field is declining, and will have to be limited to about 5,000 b/d in the future. The other discoveries, however, raised India's production to about 9,000 b/d during 1957; and a 1956 estimate by W. B. Metre, chief geologist of Assam Oil Co., gave Nahorkatiya's production potential as 50,000 b/d over 20 years, if a pipeline were available.

Details of an agreement between the government of India, the Burmah Oil Co., and its subsidiary, the Assam Oil Co., were announced in the Indian parliament, December 6. A company, in which the government's holding will be one-third, will undertake the production of oil and arrange for the construction and operation of a pipeline and related facilities for the transport of crude oil from Nahorkatiya, Hugijan, and Moran, in Assam, to Barauni in Bihar.

Oil produced by the company will be sold to two government refineries. The delivered price of crude oil payable by each refinery will be either the lowest price delivered at Calcutta, where crude oil can be secured by the refinery from any alternative source, or the cost incurred by the company plus a reasonable commercial return, whichever is less. The price, which is subject to government approval, will be fixed by the company after costs have been examined; it will be subject to review every half-year. To meet the foreign-exchange cost of the first of the two stages of construction of the pipeline, the Burmah Oil Co. has offered to advance a sterling loan of £10 million to the company, on terms to be agreed between the company and the government.

In addition to a refinery at Barauni, it is proposed that a refinery be located at an intermediate point between the oil fields and Barauni. It is likely to be located somewhere in Assam.

India's reserves, proved and probable, are estimated by the government at 40 million tons (about 300 million barrels).

**Refining:** During 1957, Caltex oil refinery in Vishakapatnam, on India's east coast, started operations.

**Marketing:** Consumption of petroleum products within India averaged about 94,000 b/d during 1956, and is estimated at over 100,000 b/d during 1957. Coal at present supplies slightly over 80% of energy requirements, and oil about 14%—having risen from 10% in 1948. Average annual compounded increase over eight years previous to 1956 was 10% (approx.). Estimates call for the 10% increase in oil use (compounded) to continue, and requirements in 1961 will be about 152,000 b/d. Presuming oil rose to 20% of energy requirements by 1976, demand would increase at an annual rise of 14% by 1967 and continue that increase until 1976, when it would amount to about 1,040,000 b/d.

The investment necessary to supply this increase is estimated by Indian sources at Rs. 3,000 crores (US $6.3 billion) during the 1956-76 period. This would be an annual expenditure of about 40 crores (US $81 million) until 1966, rising to 85 crores (US $178.5 million) yearly during the next five years and 150 crores (US $315 million) annually during the following five years.

## OIL LAWS

Substantial changes are contemplated in India's oil legislation; but, as of November 1957, the government was not prepared to reveal what it had in mind.

## NATIONAL FACTORS

The government's attitude has changed considerably in recent years, and more encouragement is being given foreign capital. A recent delegation to the United States pointed out that only about 3% of total industrial production is owned by the government, and that policy had changed to encourage private investment. There are no restrictions on profit or capital remittances in the country. Income tax on corporations is 30%, plus a supertax of 10%. There is no depletion allowance.

A USA guarantee of profits and capital repatriation is available. It does not cover production profits, however, nor expropriation.

The government has pointed out the Standard Vacuum contract specifically is not an example for future concession arrangements; and, in an industrial policy resolution, the government stated oil exploration would only be permitted by companies where the majority interest was owned by the government. END.

## Oil Law Summary★

**RECONNAISSANCE:** Reconnaissance permit grantable only to persons holding "Certificates of Approval for Petroleum" from provincial govt. where concession is located. Must contain name and nationality, company name and place of business, description of area. **Guaranty:** US $10.50 per 100 sq. mi. **Duration:** Two years. Renewable twice, one year each renewal, with govt. permission. **Annual Surface Tax:** US$ 0.21 per sq. mi. **Transfer:** With govt. consent, on payment of US$ 21.00 fee. **Surrender:** Anytime, in whole or in part, on one month's notice.

**EXPLORATION:** Holder of reconnaissance "exploring license" has exclusive right to exploration concession (known as "prospecting license") over lands covered. **Area:** No maximum or minimum specified for reconnaissance or exploration. **Application Fee:** US$ 420. **Guaranty:** US$ 20.50 per sq. mi. **Duration:** 3 yrs. Two renewals possible of one year each on approval of govt. Duration may be extended when license covers two or more geologically related areas. **Annual Surface Tax:** Minimum 8 annas, maximum one rupee (US$ 0.21) per acre. On renewal, maximum is 1 rupee 4 annas during 1st yr. rising to maximum 2 rupees (US$ 0.42) per acre during 4th and subsequent years. **Surrender:** Anytime, in whole or in part, on 3 months' notice.

**EXPLOITATION:** Known as "Mining Lease." Prospection licensee has exclusive right to mining lease over same area, subject to rules in force at time of granting. **Application Fee:** US$ 1,050. **Area:** 1,000 sq. mi. maximum, in one or more leases. **Guaranty:** US$ 2,100. Additional US$ 420 may be required by provincial govt. **Transfer:** Anytime, with govt. approval. US$ 105 fee. **Duration:** 20 yrs. Renewable for 20 yrs. at govt. option. **Refining:** Govt. may require refining of sufficient production to meet India's domestic requirements. **Royalty:** 10% on crude well-head value. Natural gas also 10%. Well-head value defined as published price of similar crude in a "substantial" free market, with adjustments to bring price back to well head. **Annual Surface Tax:** 42 US cents per acre for first 10 sq. mi., rising to US$ 2.10 per acre on all area exceeding 100 sq. mi. Concessionaire subject to surface tax or royalty, whichever is higher, but not both. **Operations:** Must begin within 1 yr. of date of lease. "Operations" includes building roads or installing equipment. **Expropriation:** Govt. has this right on payment at fair market price in case of national emergency. **Surrender:** Anytime on all or part of area, on 12 months' notice. **Govt. Participation:** May require participation of Indian capital "as agreed between govt. and operator." **Employment:** Must employ nationals as agreed with govt. and arrange for their training in India and abroad. **Arbitration:** Disputes settled by two arbitrators, one nominated by govt., one by operator.

**STANDARD-VACUUM CONTRACT: Area:** 10,000 sq. mi. **Govt. Participation:** Govt. provides ¼ investment for exploration up to $5.2 million. Company in charge of operations. **Profits Split:** Divided on 50-50 basis, apart from govt.'s proportionate interest. **Refining:** Company will construct refinery of minimum 10,000 b/d capacity if commercial production found. **Conversion:** Details concerning exploitation concession to be negotiated if commercial production found.

★Taken from *World Petroleum Legislation*, 604 Fifth Ave., N. Y. 20, N. Y. (see p's 37-38)

# the world is watching him

This child and many others like him represent the future of Asia, Africa and the lands of the Pacific. Everywhere throughout this vast area there are new stirrings of light and life. There is a new demand for modern ways that will turn over to machines the work now done by the muscles of men and animals.

This calls for more of the energy that petroleum supplies in so many forms. And here Standard-Vacuum is doing its part. For Stanvac operates wholly within these areas exploring, drilling, producing, transporting and refining oil to meet the growing needs of their huge populations.

Because of what Stanvac is doing, the babies being born today will enjoy a better life than any their fathers have known.

**STANDARD-VACUUM** OIL COMPANY **POWERS PROGRESS**

*White Plains, New York*

# INDONESIA

## PHYSICAL DEVELOPMENT

**Exploration:** Standard-Vacuum Oil Co. suspended oil exploration in Sumatra during November 1957 because of its inability to obtain permission from the Indonesian government to explore and develop new concession areas. The company's last geophysical party in Sumatra completed its mission in October. In December 1957, however, the government announced the company's exploration applications were being "considered."

Suspension of Standard-Vacuum's exploration activities in Sumatra does not at the present time affect the company's producing, refining, tanker, and marketing operations in Indonesia. In October the company dedicated the first cat-cracker unit in Southeast Asia—part of an $80 million expansion program begun in 1954.

Since World War II ended and the Japanese were forced out of Indonesia, the "big three" operating oil companies—Sarawak Oil Fields, Standard-Vacuum Oil Co., and Caltex—have tried unsuccessfully to persuade the government to grant new oil concessions.

On June 18, 1957, New British Dominion Oil Co. Ltd., Calgary, Alberta, acquired 49% of stock of Nusantara Mining Corp., through Sea Oil & General Corp., of New York. Nusantara has exploration licenses in the Palembang block, Sumatra, expiring April 3, 1959, and applications pending for 720,000 acres. The Palembang block is located in the southeastern part of Sumatra, and that part northwest of the Ogan River is straddled by the producing fields of BPM.

Most of the licenses were granted in 1956—with three-year duration, and renewable for two additional one-year periods. All are conditional on exploration work being done thereon. The company considers the areas favorable to oil development; and has exchanged, subject to stockholders' consent, 50% interest in New British Dominion for the exploration rights. An option agreement was made with Empire Resources Corp., of New York, a subsidiary of Empire Trust Co. The option expired, December 17, without being exercised. The permits, as they stand, are not valuable, since no drilling over six meters (18 ft., approx.) nor seismic work can be done.

In 1957, Caltex announced a major expansion program by Caltex Pacific Oil Co. in the producing area of central Sumatra. Its ultimate objective is to link Minas field by pipeline northward to a deep-water outlet near Dumai on the Rupat Strait, branch waterway of the Strait of Malacca. This will effect savings over today's complex operation of first pipelining Minas oil to Perawang and then shipping it by river tanker down the Siak River to the Pakning terminal. In the present river-transport system, four 24,000-bbl. vessels haul Minas crude on a 93-mile run from Perawang down the river to Sungai Pakning.

Two new oil fields will be developed early in the program. These are Duri and nearby Bekasap, which lie some 35 miles north of the Minas field.

Standard Vacuum Oil Co. late in 1957 opened its new Lirik field in central Sumatra to commercial production. Regular deliveries began when a river tanker, the "Stanvac Dijrak," took on 28,566 bbl. of crude at Buatan terminal of the 88-mile, 8-in. Lirik pipeline. Lirik was discovered in 1939. After a wartime lapse, Stanvac returned to the area in 1949. The company has spent several years designing and building the special facilities needed to handle the high pour-point crude, which solidifies at 105 F.

**Production:** Production has been rising rapidly, due almost entirely to increases in the Minas field of Caltex. It now accounts for much of Indonesian production, and Caltex has become the principal producer in the country—replacing Shell (which operates principally through BPM and NIAM). Production of Standard Vacuum and Shell is declining due to depletion of older fields.

**INDONESIA—CRUDE PRODUCTION, BY COMPANY* 1957**
(Barrels Per Day)

| | 1st Quarter | 2nd Quarter | 3rd Quarter | 4th Quarter | Year's Average |
|---|---|---|---|---|---|
| Caltex | 111,366 | 143,033 | 163,833 | 182,967 | 150,299 |
| BPM | 102,000e | 102,000e | 102,000e | 102,000e | 102,000e |
| Standard Vacuum | 60,635 | 61,545 | 58,953 | 68,380 | 62,378 |
| Total | 274,001 | 306,578 | 324,786 | 353,347 | 314,677 |

*All figures from company sources. Some estimates for 4th quarter contained.
e Estimated. Quarterly figures not available.

**Marketing:** Consumption of petroleum products in Indonesia has been rising rapidly—from 13,684,000 bbl. in 1955 to 14,811,000 (40,570 b/d) in 1956. Continuing the trend of past years, gasoline rose by only 6%; while kerosine, gas oil, and diesel oil rose by 12, 13, and 11%, respectively. Kerosine consumption is now over six million barrels a year. Fuel-oil consumption, however, dropped in 1956 by 10%. Prices of petroleum products are controlled, and some products are sold at a loss which is made up on others. Although roads are being improved with foreign aid, the severe import restrictions will affect the number of motor vehicles; however, consumption of diesel oil is expected to go on rising.

## OIL LAWS

Oil operations in Indonesia are still under the old mining code of 1890, although discussions have been held for several years on a new law. Pending the passage of this new law, exploration rights of the companies in Indonesia have been placed in moratorium.

In its full application, the old mining law of 1890 has not been used since about 1920. At that time, its application to petroleum was discontinued for the most part, and concessions were given under Sect. 5A of the 1890 mining law. Sect. 5A is given in translation as follows:

Sect. 5A (amended statutes, 1910, No. 588 and, 1919, No. 4).

"1) The government are entitled to have prospecting and developing carried out, wherever such works are not contrary to the rights granted to prospectors or concessionaires.

"2) For that purpose government may either undertake prospecting and developing themselves or may enter into agreements with persons or companies satisfying the provisions of sub-section 1 of section 4 of this Act, whereby they bind themselves to undertake prospecting, developing, or both prospecting and developing.

"3) Such agreements, with the exception of those which exclusively refer to the undertaking of prospecting, shall not be entered into, unless in each case the law authorizes to do so.

"4) The decree whereby territories (areas) or regions are reserved for prospecting or developing on the basis of the meaning of this Section, shall mention the minerals forming the subject of that prospecting and developing."

Although the 1890 Mining Law is the only law governing petroleum presently in existence in Indonesia (and it has not been amended except for the 5A clause), study of a new mining law and of a new petroleum law has been carried on by the Indonesian government for many years. Pending the passage of such a new law, no new oil rights have been given, under the so-called "Hassam" resolution of the end of 1950 or beginning of 1951. Several draft mining laws and several draft petroleum laws have been prepared; all have been rejected. They have been tied to the new Foreign Investment Law, which was sent from committee to parliament during 1957. The draft petroleum law and the mining law were also sent to parliament. The mining law did not differ in great degree from the petroleum law as the two drafts were presented, which made oil interpretation more difficult, since both laws would apply. The draft mining law was rescinded by the Mines Department late in

**REFINERIES IN INDONESIA—1957**

| *Name of Company* | *Plant Location* | *Crude Capacity* | *Type Plant* | *Cracking Capacity* |
|---|---|---|---|---|
| N. V. de Bataafsche Petroleum Mij (Shell) | Balik Papan, N.E. Borneo | 59,000 | SW | — |
| | P. Brandon, Sumatra [1] | | | |
| | Paladju, Sumatra [2] | 95,000 | SC | 10,000T |
| | Tjepu, Java | 4,600 | S | — |
| | Wonokroma, Java | 3,200 | SA | — |
| N. V. Standard-Vacuum Petroleum Mij. | Sungi, Gerong [3] | 71,500 | SCW | 34,500T |
| | Total | 230,300 | | 44,500T |

[1] Closed down, impossible to resume operations.
[2] 15,000 b/d thermal reforming capacity.
[3] Revamping existing plant, polymerization plant, and fluid catalytic cracker.

Capacities are in barrels per day. Key to type of plant: S—skimming; W—wax; A—asphalt; C—cracking; Under cracking capacity to indicate type: T—thermal; C—catalytic. All data as of December 1, 1957.

1957. The petroleum law was also taken back, and is to be completely revised. The Foreign Investment Law was rejected by Parliament in its entirety about September 1957.

At present, there is no indication of what the new oil law will contain. In all probability, Indonesia either will become completely communist or will produce a law which will be operable for foreign companies. Pressure has been put on the need for a new oil law by the passage of workable legislation in Iran based on the 50-50 division of profits, and the entry of Japanese companies into the Middle East. There is much investment flowing to the Middle East, and to Venezuela, which would have been available to Indonesia if a workable law had been passed.

Recently, representatives of the Indonesian government were in the United States, Mexico, and Canada looking for a petroleum advisor who was neither American, Dutch, nor British. Names of several persons, including some Canadians, were submitted to them. It is not known what choice was made.

## NATIONAL FACTORS

Indonesia obtained her formal independence in 1949, and has since been seeking a solution to the problems of economic and political instability. Fundamental causes of such instability are: (1) The religious vs. secular problem: About 90% of the population is Moslem and split about 50-50 between the orthodox and nonorthodox. (2) Regionalism: About two-thirds of the population is concentrated on Java; the rest is in the outer islands. There have been repeated political and military coups in the outer islands, and their regionalism manifests itself in a financial way as well, since Sumatra and the other richer islands contribute more than the others but do not receive a commensurate amount in government services. (3) Communism: In the 1955 general elections, the communists were fourth in total votes. They are particularly strong in Java, where local elections recently showed an increase in communist strength. The communists have the advantage of never having been in power; consequently, they have made no mistakes, while the other parties have. The next general election is set for 1960. By that time, communist influence probably will be much stronger.

The final factor is the division between President Sukarno and former President Hatta. The two parted company in 1956, when Hatta resigned. His leanings are more anti-communist and those of a business leader than the more spiritual Sukarno's. The division between the two has done much to further political instability.

It has been extremely difficult for the new country to formulate its basic laws. A new constitution has been pending since 1955, and probably will not be finished for another two or three years. The investment climate, consequently, is uncertain. The country's strong nationalism is tinged with suspicion of any foreign company—manifested in the recent nationalization of all Dutch enterprises within Indonesia. BPM was exempted from the expropriation because of the holdings of other nationals in the company. It is doubtful this attitude toward foreign investors will change for the better during the coming few years, in view of the country's deep-rooted problems.

END.

### INDONESIA—PRODUCTION & DRILLING DATA

| Name of Field | Year Discovered | Depth (Feet) | API Gravity | Production (Barrels Per Day) 1956 |
|---|---|---|---|---|
| **KALIMANTAN** | | | | |
| Anggana-Muara | 1902 | 380-3,200 | 20.5-32.1 | 1,670 |
| Balik Papan (Klandasan) | 1903* | 380-765 | 14.7 | — |
| Bunju | 1930 | 2,020-7,850 | 24.5-33.1 | 8,950 |
| Sambodja | 1910 | 160-4,400 | 23.3-31.1 | 906 |
| Sanga Sanga | 1897 | 430-2,900 | 20.8-32.1 | 3,158 |
| Sangatta | 1940* | 1,640-4,200 | 36.0 | 1,150 |
| Tandjung | 1938** | 2,500-4,300 | 36.8 | 136** |
| Tarakan | 1906 | 195-2,400 | 18.2 | 3,965 |
| Total Kalimantan | | | | 18,785 |
| **CERAM** | | | | |
| Bula Lemum | 1897* | 240-920 | 123.0 | — |
| **JAVA** | | | | |
| Kawengan | 1926 | 1,750-2,700 | 33.9 | 8,611 |
| Kruka | 1929 | 970-1,600 | 28.0 | 611 |
| Ledok | 1896* | 320-3,200 | 43.0 | — |
| Lidah Kuldon | 1896* | 490-1,330 | 24.5 | — |
| Nglobo-Semanggi-Banjuasin | 1897* | 370-3,350 | 43.0 | — |
| Total Java | | | | 9,222 |
| **SUMATRA (Northern District)** | | | | |
| Abab† | 1951 | 6,000 | 35.0 | 600 |
| Babat | 1901 | 100-1,050 | 39.2 | 45 |
| Badjubang | 1927 | 2,700-3,300 | 46.7 | 2,668 |
| Benakat† | 1933 | 1,500 | 36.0 | 15,300 |
| Betun† | 1949 | 6,500 | 35.0 | 800 |
| Betung | 1923* | 180-950 | 40.5 | — |
| Djirak† | 1930 | 900 | 37.0 | 3,200 |
| Genung Kemala | 1938 | 6,200-6,340 | 38.1 | 5,146 |
| Karang Rining | 1903* | 160-1,200 | 42.5 | — |
| Kenali Asam | 1931 | 1,150-4,020 | 24.3-44.8 | 13,003 |
| Kluang | 1914* | 2,300-2,600 | 40.0 | — |
| Kruh† | 1941 | 3,300 | 38.0 | 100 |
| Limau | 1928 | 4,450-5,350 | 30.1 | 17,216 |
| Mangundjaja | 1935 | 660-2,200 | 24.4 | 1,882 |
| Meruo Senami | 1938 | 2,400-2,650 | 46.9 | 379 |
| Muara Enim Complex | 1903 | 300-1,150 | 42.2 | — |
| Prabumulih West | 1953 | 4,740-5,640 | 31.5 | 3,211 |
| Radia† | 1940 | 6,500 | 40.0 | 3,800 |
| Setiti | 1936 | 1,850-1,970 | 40.1 | 75 |
| Suban Djerigi | 1905 | 1,300-2,500 | 49.9 | 542 |
| Talang Akan-Pendopo† | 1922 | 2,800 | 37.0 | 40,000 |
| Talang Djimar | 1937 | 3,600-4,200 | 29.1 | 19,610 |
| Tandjung Tiga | 1940 | 4,400-4,600 | 26.9 | 5,762 |
| Tempino | 1931 | 1,930-2,700 | 46.3 | 7,611 |
| T. Luntar | 1912* | 2,200-2,800 | 56.0 | — |
| Total Southern District | | | | 140,950 |
| **SUMATRA (Northern District)** | | | | |
| Djrajeu | 1929 | 2,520-2,590 | 54.5 | — |
| Gebang | 1936 | 2,970-3,400 | 54.0 | — |
| Pangkatan Susu | 1917 | 1,550-2,100 | 56.0 | — |
| Pace | 1939 | 2,520-2,590 | 34.5 | — |
| PuluPandjang | 1928 | 1,640-2,400 | 55.5 | — |
| Perlack | 1900 | 160-2,200 | 57.0 | — |
| P. Tabuhan | 1937 | 3,300-3,500 | 52.5 | — |
| Rantau | 1929 | 1,040-2,560 | 48.5 | — |
| Serang Djaja | 1926 | 3,560-4,150 | 64.5 | — |
| Telaga Said DKG | 1893 | 210-720 | 51.5 | — |
| Total Northern District | | | | — |
| **SUMATRA (Central District)** | | | | |
| Bekasap | 1955 | 2,400 | 35 | — |
| Duri | 1940 | 730 | 22 | — |
| Kotabatak | 1952 | 4,800 | 32 | — |
| Lirik** | 1939 | 1,800 | 34 | — |
| Minas | 1944 | 2,460 | 36 | 87,000 |
| Molek** | 1956 | 2,700 | 34 | — |
| Pungut | 1951 | 2,940 | 39 | — |
| Sago** | 1940 | 1,800 | 34 | 1,000 |
| Sebanga | 1940 | 1,200 | 30 | — |
| South Pulai** | 1941 | 1,800 | 34 | 50 |
| Total Central District | | | | 88,050 |

*No activity. **Field shut in for lack of pipeline connections. At Tandjung, 20,000 b/d shut in 1956. †No breakdown of wells by fields available.

### INDONESIA—ROYAL DUTCH-SHELL PRODUCTION AND DRILLING

| Field | Locale | Company | Daily Production (Barrels) (1956) | Number Wells Producing Jan. 1, 1957 | Number Well Completions (1956) | Footage Drilled (1956) |
|---|---|---|---|---|---|---|
| Kawengan | Java | NV de BPM (Shell) | 8,643 | 83 | 0 | 0 |
| Kruka | Java | NV de BPM (Shell) | 611 | 51 | 0 | 0 |
| Anggana-Muara | Kalimantan | NV de BPM (Shell) | 1,741 | 86* | 0 | 0 |
| Balik Papan | Kalimantan | NV de BPM (Shell) | 7 | 0 | 0 | 0 |
| Sambodja | Kalimantan | NV de BPM (Shell) | 914 | 48 | 0 | 0 |
| Bunju | Kalimantan | NVNIAM | 8,978 | 34 | 3 | 22,037 |
| Sanga Sanga | Kalimantan | NV de BPM (Shell) | 3,110 | 88** | 0 | 0 |
| Tandjung | Kalimantan | NV de BPM (Shell) | 188 | 0 | 2 | 10,670 |
| Tarakan | Kalimantan | NV de BPM (Shell) | 3,785 | 406 | 0 | 387† |
| Babat | S. Sumatra | NV de BPM (Shell) | 40 | 20 | 0 | 0 |
| Badjubang | S. Sumatra | NVNIAM | 2,475 | 29 | 1 | 2,926 |
| Genung Kemala | S. Sumatra | NV de BPM (Shell) | 4,991 | 20 | 4 | 36,530 |
| Kenali Asam | S. Sumatra | NVNIAM | 12,483 | 101 | 13 | 30,354 |
| Limau | S. Sumatra | NV de BPM (Shell) | 17,394 | 49 | 23 | 127,229 |
| Mangundjaja | S. Sumatra | NV de BPM (Shell) | 1,686 | 42 | 0 | 0 |
| Meruo Senami | S. Sumatra | NVNIAM | 277 | 6 | 2 | 7,526 |
| Prebumulih West | S. Sumatra | NV de BPM (Shell) | 3,806 | 10 | 3 | 17,142 |
| Sei Taham | S. Sumatra | NV de BPM (Shell) | 3 | 0 | 0 | 0 |
| Setiti | S. Sumatra | NVNIAM | 300 | 3 | 5 | 14,550 |
| Suban Djerigi | S. Sumatra | NV de BPM (Shell) | 573 | 21 | 0 | 0 |
| Talang Djiman | S. Sumatra | NV de BPM (Shell) | 19,249 | 90 | 4 | 15,192 |
| Tandjung Tiga | S. Sumatra | NV de BPM (Shell) | 5,709 | 29 | 0 | 0 |
| Tempino | | NVNIAM | 7,813 | 95 | 2 | 2,926 |
| Totals | | | 104,774 | 1,311 | 62‡ | 288,189 |

*Includes three gas wells. **Includes five gas wells. †For deepening old well. ‡Of the 62 completions, 57 were oil; 2 gas; 3 dry.

# BURMA

## PHYSICAL DEVELOPMENT

**Exploration:** Outstanding development during 1957 was the spudding in, December 6, of Burma's first postwar wildcat well at Ondwe, in the Magwe district of central Burma. Santa Fe Drilling Co. are the contractors. A 13,000-ft. rig is being used. The Ondwe structure is a well developed dome on the same axis of uplift as Yenangyaung field about 30 miles northwest. The Burmah Oil Co. (1954) Ltd. is the exploring company—owned one-third by the government and two-thirds by the Burmah Oil, Indo-Burma Petroleum, and British Burmah Petroleum companies. Another deep test is to be drilled during 1958 in the Irrawaddy delta.

**Production:** Burma still has not recovered from the Japanese occupation, as the accompanying production figures show. Production in 1957 was about 8,900 b/d—about half the country's production prewar.

**BURMA—PRODUCTION 1957**
(Barrels Per Day)

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Jan. | 6,600 | April | 8,300 | July | 9,100 | Oct. | 10,100* |
| Feb. | 6,500 | May | 8,300 | Aug. | 10,200 | Nov. | 10,100* |
| March | 7,300 | June | 10,200 | Sept. | 10,200* | Dec. | 10,200* |
| | | | | | | Year | 8,900* |

*Estimate.

**BURMA—PRODUCTION AND DRILLING DATA 1956**

| Name of Field | Year Discovered | Depth (Feet) | API Gravity | Production (Barrels Per Day) |
|---|---|---|---|---|
| Chauk-Lanywa | 1902 | 2,500 | 36 | 3,321 |
| Others | | | | 800* |
| Total, B/D | | | | 4,121 |

*Estimate.

NOTE: BOC (1954) drilled 15 development wells in Chauk-Lanywa in 1956, and reconditioned old wells. Same company did nine party-months of reflection seismograph work in the delta of the Irrawaddy River in 1956.

**BURMA—CRUDE PRODUCTION**
(Barrels)

| | |
|---|---|
| 1956 | 1,695,300 |
| 1952 | 996,000 |
| 1951 | 915,000 |
| 1950 | 640,000 |
| 1938 | 7,803,000 |

**Refining:** There are two refineries in the country, as listed in the accompanying table. There is also a 3,000 b/d skimming plant owned by Nathsingh Oil Co. Ltd., at Yenangyaung. During the year, the Syriam refinery—which had been completely destroyed during the war—was rebuilt. Foster Wheeler Ltd. built the 3,500 b/d crude distillation unit under contract with BOC. It is much smaller than the 21,000 b/d plant which was in operation before the war, but makes the country's refining capacity equal to consumption.

**Marketing:** Consumption in Burma during 1957 is estimated at 5,770 b/d—having risen from 5,235 b/d in 1955.

## OIL LAWS

Petroleum legislation in Burma is antiquated—much of it dates from the beginning of oil development about 1889—and it is currently being reexamined by the government to speed development of the country's oil resources.

During 1957, the Petroleum Resources Act was passed, which gives the government the right to grant concessions on such terms as it sees fit. Meanwhile, a draft oil law is being prepared with the aid of advisors from Standard Vacuum and the Burmah Oil Co. (1954) Ltd.

The proposed law divides operations into three stages: exploration license, prospecting license, and mining lease. These correspond generally to the reconnaissance, exploratory (including drilling), and exploitation stages.

During reconnaissance, the maximum area per license is 2,000 square miles. There is no limit on the number of licenses which may be held by one company. Initial duration of the license is two years, renewable at the operator's option twice for one year each time. Further renewals may be granted with governmental approval. Taxes during this period are very low.

During the exploratory period, known as the "prospecting license," the maximum per license is 250 square miles—with a limit of 2,000 square miles per company or licensee. Initial duration of the license is three years. It is renewable twice, for one year each renewal. More renewals are conditional upon governmental approval.

Fiscal requirements are almost identical with those of the Indian oil law. There is no bonus payment specified in the law.

The final stage of the law is the exploitation concession phase, designated the "mining lease." Initial duration is 20 years—with right to renew for 20 years subject to the same terms as the original lease, except that the government may request an increase in the royalty and dead-rent payments up to twice their original levels. Royalty during the original lease is 10%. Maximum lease area is five square miles. Maximum per concessionaire is 300 square miles.

The usual arbitration provisions are found in the law. An unusual aspect is the authority for the government to enact proration and conservation rules—a provision not generally found in oil laws of the Far East.

Fiscal specifications are not contained in the proposed law as presently drafted. The government feels its general taxation is sufficient.

Training of Burmese is provided in the law. The total employment of nationals is a minimum of 85% after 15 years of operation.

## NATIONAL FACTORS

Principal deterrent to investment—the government's attitude—took a turn for the better in 1957. The new oil law is expected to be workable, especially if combined with a new foreign-investment law which will be passed upon in February. It provides for exemption of foreign companies for three years from the high (60%) profits tax, and also for exemption of profits made during the year if re-invested within one year.

Going back a few years: The country was politically unsettled following World War II; and, under a constitutional provision that industries may be nationalized or acquired by the State, the government nationalized several British and Indian processing and distributing enterprises in 1950. Compensation has not been given in all cases, but no major nationalization action has been taken for about three years now—and none is known to be pending.

Under the Burmese constitution, exploration and exploitation rights are reserved to Burmese citizens, or to companies with 60% Burmese capital. Under an enabling act, the government was given the right to grant these rights to foreigners if, among other provisions, no Burmese company was available to carry on the same venture. The constitutionality of this act was challenged and upheld by the Burmese Supreme Court in 1953, and presumably it forms the basis of the proposed oil law and, therefore, of any oil rights gained or to be gained in Burma.

Under a joint-venture agreement of January 12, 1954, the government owns 33 1/3% (note: this is a correction of the 50% figure given in *World Petroleum Report 1957*) of The Burmah Oil Co. (1954) Ltd. held under provision of the Special Company Act of 1954. The government is given the right to increase this participation on payment of a specified sum in sterling. It is probable that any other company exploring in the country would be obliged to offer a certain amount to the government as participation. END

**REFINERIES IN BURMA—1957**

| *Name of Company* | *Plant Location* | *Crude Capacity* | *Type Plant* | *Cracking Capacity* |
|---|---|---|---|---|
| Burmah Oil Co. (1954) Ltd. | Chauk | 3,000 | S | — |
| | Syriam | 3,500 | S | — |
| | Total | 6,500 | | |

Capacities are in barrels per day. Key to type of plant: S—skimming; L—lubricating; A—asphalt; C—cracking; Comp.—complete. Under cracking capacity to indicate type: T—thermal; C—catalytic. All data as of December 1, 1957.

# JAPAN

## PHYSICAL DEVELOPMENT

**Exploration:** Despite an active exploration campaign designed to offset declining production levels, only one significant discovery was reported during 1957. It was by the Petroleum Resources Development Co. in Niigata prefecture, 600 miles northeast of Tokyo, at 4,950 ft at Oguchi, Nakanoshima village, 3¾ miles north of Nagaoka. The new find is believed bigger than the company's oil field at Yabase in Akita prefecture, which at present is the nation's biggest field. Production was about 150 b/d. The structure is about 5 miles long, by ¼ mile wide.

Japan's first deep well was spudded in by Teikoku Oil Co., near the Japanese Sea, about 6¼ miles from Nagoaka, on the opposite side of the island of Honshu on which Tokyo is located, in mid-1957. Rig is a National Supply Co. type 110, capable of a 12,000-ft. depth. Present wells in Japan have a maximum depth of less than 6,000 ft. Sands exceptionally thick, for Japan, were topped at 3,600 ft. Gas shows were encountered at 4,500 ft. A good oil show was found at 4,900 ft., producing about 150 b/d. Sands of the same formation produce nearby from 1,050 ft. in the 60-year-old Nishiyama field.

**Production:** Crude-oil production in Japan during 1956 was 344,828 kiloliters (about 5,470 b/d)—a drop from the 349,102 kiloliters during 1955. It rose to 6,200 b/d in 1957. Crude-oil reserves are estimated at about 25 million barrels, 12 times present annual production.

The demand for city gas in Japan has been increasing about 10% each year for several years. Use of city gas in Japan during 1954 was 2,187 million cubic meters; in 1955, it was 2,414 million; and in 1956 was 2,852 million. To meet increasing demands, gas producers in Japan have to invest about Y3 billion ($233,333) each year to expand production facilities. The major gas producer in Japan is the Tokyo Gas Co., which produces about half the city gas in Japan and is the sole supplier for the Tokyo area.

Tokyo Gas has been considering importing liquid petroleum gas (LPG). Caltex and Shell Oil can supply some 1.3 billion cubic meters of LPG from Borneo or Sumatra, and other reports have indicated that Tokyo Gas may also look to Middle East sources. Mitsubishi Sheji Kaisho Ltd., which could handle the import negotiations, is now studying the problem jointly with Tokyo Gas. Tentative and as yet unformulated plans call for the importation of 30,000 or 40,000 tons of LPG to produce 150 million cubic meters of city gas annually no earlier than 1959. Those amounts would be increased to a level of about 400,000 tons of LPG imported annually to make 1,300 million cubic meters of gas if the initial attempt proves successful.

**Transportation:** A six-year port-expansion program of the Ministry of Transportation will get under way in the middle part of the 1957-58 Japanese fiscal year—with the expansion of 15 major harbors to enable accommodation of large supertankers. Appropriations totaling $27.5 million have been earmarked for this fiscal year for the local harbor enlargement program.

At present, only Yokohama harbor and Shimotsu harbor in Wakayama prefecture are capable of taking care of supertankers of the 20,000- to 30,000-ton class. There are no Japanese harbors which can accommodate vessels of the 35,000-ton and upward class.

**JAPAN—PRODUCTION AND DRILLING DATA**

| Name of Field | Year Discovered | Depth (Feet) | API Gravity | Production (Barrels Per Day) 1956 |
|---|---|---|---|---|
| AKITA PREFECTURE | | | | |
| Hachimori | 1938 | 1,480 | 26 | 63 |
| Yabase | 1939 | 320-5,580 | 28-36 | 3,754 |
| Innai | 1934 | 2,540 | 22 | 337 |
| Others | | | | 506 |
| | | | | 4,660 |
| YAMAGATA PREFECTURE | | | | |
| Ishinazaka | 1944 | 650 | 18 | 174 |
| Mogami | 1952 | 1,500-2,550 | 17-28 | 44 |
| Others | | | | 19 |
| | | | | 237 |
| NIIGATA PREFECTURE | | | | |
| Niitsu | 1896 | 420-4,270 | 18.6 | 415 |
| Higashiyama | 1893 | 590-2,100 | 33.4 | 172 |
| Nishiyama | 1897 | 1,050 | 37.4 | 100 |
| Others | | | | 100 |
| | | | | 849 |
| OTHER JAPAN | | | | 56 |
| Average b/d | | | | 5,800 |

Natural-gas production in 1956 was about 6.2 billion cubic feet —10% over 5.5 billion in 1955.
Estimated reserves of oil, 25 million barrels as of 1st of 1957.

**Refining:** The expansion of petroleum refining capacity in Japan is regarded as one of the significant economic factors in the country. At the end of 1955, distillation capacity of 35 plants was 282,500 bbl. per stream-day. At the end of 1956, it rose to 40 plants with 368,900; at the end of 1957, it reached 41 plants, with

**JAPAN—DRILLING & PRODUCTION, BY COMPANIES**

| Company and Province | Well Completions (1956) Wildcat Oil | Wildcat Gas | Wildcat Dry | Development Oil | Development Gas | Development Dry | Total Dev. | Well Status Jan. 1, 1957 Producing Oil | Producing Gas | Shut In | Drilling | Footage Drilled During 1956 | Crude Production 1956 (Barrels) | Gas Production 1956 (Cubic Feet) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Daido Oil Co.: | | | | | | | | | | | | | | |
| Akita | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 0 | 1 | 0 | 4,614 | 2,565 | 0 |
| Niigata | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 13 | 0 | 1 | 0 | 0 | 2,352 | 0 |
| Hokuriku Gas Co.: | | | | | | | | | | | | | | |
| Niigata | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 20 | 0 | 0 | 0 | 0 | 289,597,811 |
| Koto Natural Gas Co.: | | | | | | | | | | | | | | |
| Tokyo | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 7 | 6 | 2 | 9,967 | 0 | 76,049,367 |
| Kyoei Kogyo Co.: | | | | | | | | | | | | | | |
| Niigata | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 9 | 0 | 0 | 0 | 0 | 149,139,888 |
| Nihon Kogyo: | | | | | | | | | | | | | | |
| Akita | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 4 | 0 | 2 | 0 | 4,088 | 2,025 | 0 |
| Nihon Gas Co.: | | | | | | | | | | | | | | |
| Niigata | 0 | 0 | 0 | 0 | 2 | 0 | 2 | 0 | 14 | 0 | 0 | 14,841 | 0 | 385,736,938 |
| Nihon Sakusen Co.: | | | | | | | | | | | | | | |
| Niigata | 0 | 0 | 0 | 0 | 2 | 0 | 2 | 0 | 34 | 2 | 0 | 0 | 0 | 800,598,281 |
| Nihon Light Metal Co.: | | | | | | | | | | | | | | |
| Niigata | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 12 | 5 | 0 | 0 | 0 | 137,299,068 |
| Nihon Natural Gas Co.: | | | | | | | | | | | | | | |
| Chiba | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 31 | 4 | 0 | 0 | 0 | 257,538,386 |
| Niigata Kotsu Co.: | | | | | | | | | | | | | | |
| Niigata | 0 | 0 | 0 | 0 | 3 | 0 | 3 | 0 | 16 | 0 | 0 | 5,659 | 0 | 201,738,053 |
| Nippon Pet. Mining Co.: | | | | | | | | | | | | | | |
| Akita | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 16 | 0 | 4 | 0 | 0 | 7,353 | 0 |
| Nitto Boseki Co.: | | | | | | | | | | | | | | |
| Niigara | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 10 | 5 | 0 | 0 | 0 | 180,605,637 |
| Oil Shigen Kaihatsu: | | | | | | | | | | | | | | |
| Hokkaido | 2 | 0 | 13 | 1 | 0 | 0 | 1 | NA | 0 | 4 | 6 | 59,895 | 346 | 0 |
| Otaki Natural Gas Co.: | | | | | | | | | | | | | | |
| Chiba | 0 | 0 | 0 | 0 | 4 | 0 | 4 | 0 | 32 | 35 | 30 | 143,734 | 0 | 376,598,403 |
| Teikoku Oil Co.: | | | | | | | | | | | | | | |
| Hokkaido | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 110 | 1 | 10 | 1 | 11,309 | 14,275 | 23,820,546 |
| Akita | 0 | 0 | 1 | 47 | 0 | 12 | 59 | 1,269 | 0 | 457 | 10 | 278,188 | 1,596,486 | 519,360,357 |
| Yamagata | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 48 | 0 | 13 | 0 | 3,749 | 199,190 | 47,805,096 |
| Niigata | 0 | 0 | 1 | 5 | 27 | 1 | 33 | 1,042 | 76 | 366 | 11 | 95,569 | 275,824 | 937,369,582 |
| Others | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 910 | 284 | 571 | 7 | 48,836 | 68,552 | 857,675,946 |
| Totals | 2 | 0 | 15 | 53 | 40 | 16 | 109 | 3,439 | 546 | 1,486 | 67 | 780,449 | 2,168,968 | 6,240,933,359 |

410,300. Actual production at refineries was 7.8 million kiloliters in 1955, and 10.8 million (681,400,000 bbl.) in 1956. Nearly two million kiloliters of the 37% increase was in heavy oil.

Refineries adding to capacity include: Nippon Petroleum Refining Co. added 22,000 b/d capacity for atmospheric distillation at its Yokohama plant, 16,500 b/d at its vacuum-atmospheric still at Kudomatsu, and 10,000 b/d capacity for atmospheric distillation at its Muroran plant.

**JAPAN—DEMAND FOR OIL PRODUCTS**

**(Thousands of Kiloliters)**
(Estimated on Basis of Japanese Fiscal Year)

| | 1957 | 1956 | 1955 |
|---|---|---|---|
| Gasoline | 3,900 | 3,327 | 2,657 |
| Jet fuel | 140 | 26 | 2 |
| Kerosine | 1,000 | 769 | 542 |
| Gas oil | 1,090 | 931 | 827 |
| Heavy oil | 9,510 | 7,279 | 5,816 |
| Lubricating oil | 600 | 503 | 426 |
| Paraffin, grease, asphalt (1,000 kilograms) | 370 | 256 | 213 |

Source: Japanese Petroleum Assn.

Showa Oil Co. added a 15,000 b/d atmospheric distillation unit to its Kawaski refinery and 1,000 b/d to the atmospheric still of the Niigata plant. Toa Nenryo Kogyo Co. added 6,000 b/d of atmospheric distillation equipment at its Wakayama refinery. Nippon Oil Co. added 3,900 b/d of capacity to its atmospheric distillation unit at its Niigata plant. Kitanihen Oil Co., a new firm, completed a plant at Hekadate with capacity of 12,000 b/d.

Idemitsu Kosan KK, a marketing firm, completed a 35,000 b/d plant at Tokuyama in March 1957. The Azia Oil Co. completed a 6,000 b/d plant at Yokahama in March 1957.

Four Japanese refineries have plants which were to increase atmospheric distillation capacity by a total 99,500 b/d by the end of 1957. They are: Showa Oil Co., 40,000 b/d capacity increase at its Yokkaichi refinery; Mitsubshi Oil Co., 25,000 b/d increase at its Kawasaki refinery; Nippon Oil Co., 7,500 b/d increase at its Niigata refinery; Toa Nenryo Kogyo Co., 27,000 b/d increase at its Shimzes refinery.

During 1958, General Bussan Kaisha plans to construct a 25,000 b/d plant at Kawasaki, near Tokyo, for use by the end of the year. Maruzen Oil Co. has tentative plans for construction of a plant in the Chiba prefecture.

During 1956, Toa Nenryo added the first alkylation equipment in Japan since the close of the war—a unit at its Wakayama refinery with daily capacity of 1,140 bbl. of aviation gasoline. All told, the 1956 expansion in refining capacity was carried on a cost of some Y34.9 billion ($96 million). During 1957, a total of Y31.8 billion, ($88 million) was spent.

About 35% of Japan's oil refinery capital stocks are owned by foreigners.

**Marketing:** Estimated oil consumption in Japan during 1956 rose 15.8%. In 1957, consumption showed a further increase of 10.6%.

Japan, which produces 3% of crude requirements, in 1956 spent $313 million for imports. Japan has become the first importer of Safaniya (Saudi Arabia) crude oil. Japan Oil Co. Ltd. signed a contract with Caltex for the chartering of three tankers to carry 440,000 bbl. of crude it imports from Safaniya.

Consumption of oil in Japan constituted only 5% of the total use of industrial energy in fiscal year 1950-51, but increased to 17% of the total in the Japanese 1956-57 fiscal period. Total domestic demand for industrial energy, in terms of coal equivalent, was 96,470,000 tons in 1956-57.

## OIL LAWS

The Japanese oil law, the Development of Petroleum and Inflammable Natural Gas, came into force, January 31, 1951, and contains special provisions with respect to the holding of exploration leases for petroleum and natural gas. Such leases may be held for an initial period of two years, renewable for a maximum of three additional two-year periods at the discretion of the government. Royalty payments and rentals on leases are low. Maximum royalty is 2% of the value of production; as for the minimum rate, it is known only that production in recent years has generally been below the levels at which royalties were payable.

The Japanese company law does not provide for any discriminatory treatment of foreign enterprises operating in Japan. Branches of foreign companies intending to do regular business in Japan are subject to the same regulations as companies organized in Japan regarding the appointment of representatives, the establishment of an office, registration, public notices, etc. Under this legislation, a number of American and British oil companies have made large investments in Japanese oil refineries in recent years. As regards crude-oil production, the Japanese government is reported to be favorably inclined to the re-entry of foreign capital into the crude-producing field.

**Conservation:** In June 1952, after three years of controversy, a new Petroleum and Inflammable Natural Gas Resources Development Law was passed. The law, which had been recommended by American petroleum engineers, is designed to proper production practices and conservation principles. Among its various features are provisions for unit operations of adjoining leases. Subsidies for secondary-recovery operations, as well as for exploration surveys and drilling, under certain conditions, also are included. The law is administered by a special technical committee, the Petroleum Resources Council, which acts as an advisory technical council to the Mining Bureau. The law was strongly opposed by the Teikoku Oil Co., whose board of directors resigned following its passage.

## NATIONAL FACTORS

The primary limiting factor in the Japanese investment scene has been the governmental attitude which limited the investment of foreign capital. This, combined with mediocre geological prospects, has kept much potential oil investment away.

The local enterprise tax of 12% is imposed on companies, plus a national corporation tax of 35% up to 500,000 yen ($1,385) and 40% over 500,000 yen ($1,385), effective July 1, 1955. The enterprise tax is deductible from income subject to the corporate tax. Family corporations (a Japanese corporation in which more than 30% of the shares are owned by another corporation) pay 5% over 500,000 yen ($1,385) on undistributed profits. This would include a Japanese subsidiary of a USA corporation. There is also a 12½% municipal inhabitants tax levied on the national corporation tax payable.

There is no remittance tax. Transfers on dividends are permitted, with the convertibility of exchange privilege guaranteed. An annual remittance up to 20% of original investment is allowed after the lapse of a deferment period of two years. However, the Foreign Exchange Control Board must approve the application.

END

## REFINERIES IN JAPAN—1957

| *Name of Company* | *Plant Location* | *Crude Capacity* | *Type Plant* | *Cracking Capacity* |
|---|---|---|---|---|
| Mitsubishi Oil Co. | Kawasaki [4] | 29,400 | Comp. | 3,000T |
| Nippon Mining Co. | Funakawa [14] | 15,300 | Comp. | — |
| Nippon Oil Co. | Akita | 6,300 | Comp. | — |
| | Niigata [5] | 7,500 | Comp. | — |
| | Kashiwazaki | 1,500 | SL | — |
| Nippon Petroleum Refining Co. | Yokohama [6] | 46,000 | Comp. | 5,600C |
| | Kudamatsu [7] | 26,500 | Comp. | — |
| | Muroran | 8,300 | S | — |
| Showa Oil Co. | Kawasaki [8] | 27,000 | Comp. | — |
| | Yokkaichi [9] | | | |
| | Niigata | 11,000 | Comp. | — |
| | Hirasawa | 3,000 | Comp. | — |
| Toa Nenryo Kogyo K.K. | Shimizu [10] | 7,500 | SL | — |
| | Wakayama [11] | 48,000 | Comp. | 13,700TC |
| Asia Oil Co. | Yokohama [12] | 11,000 | SLA | — |
| Idemitzu Kosan K.K. | Tokuyama [13] | 35,000 | Comp. | — |
| Toa Oil Co. | Kawasaki | 6,000 | S | — |
| Taiyo Oil Co. | Kameoka | 1,000 | SLA | — |
| Kita Nippon Oil Co. | Hakodate | 12,000 | S | — |
| | Total | 410,300 | | 32,800TC |

[1] 2,700 b/sd Platformer started in 1957.
[2] 1,300 b/sd Platformer capacity. 1800 b/sd Platformer and 3,220 b/d feed preparation unit complete end of 1957.
[3] 3,000 b/sd Platformer complete 1957.
[4] 25,000 b/sd under construction: complete 1957 and a 3,000 b/sd Platformer complete end of 1957. 1,500 b/sd Platforming capacity.
[5] 1,600 b/sd catalytic reformer complete 1957.
[6] 3,000 b/sd Platformer complete 1957.
[7] 1,300 b/sd catalytic reforming capacity.
[8] 1,500 b/sd catalytic reforming capacity.
[9] 40,000 b/sd topping plant under construction: complete mid-year 1958, also a 9,000 b/sd fluid cat. cracker: complete end of 1958.
[10] 27,000 b/sd topping plant under construction: complete April 1958 also a 3,500 b/sd cat. reformer: complete April 1958.
[11] 4,700 b/sd catalytic reforming capacity.
[12] 1,000 Platformer complete 1957.
[13] 3,000 b/sd Platforming capacity. 7,000 b/sd fluid cat. cracker complete June 1957.
[14] 1,000 b/d Platformer planned.
[15] 6,000 b/d vacuum flashing plant planned.

Capacities are in barrels per day. Key to type of plant: S—skimming; L—lubricating; A—asphalt; C—cracking; Comp.—complete. Under cracking capacity to indicate type: T—thermal; C—catalytic.
All data as of December 1, 1957.

# PAKISTAN

## PHYSICAL DEVELOPMENT

**Exploration:** There are now about nine companies exploring actively in Pakistan—four of them drilling actively. The most recent arrivals are Tidewater Oil Co.; American Overseas; and Pakistan Sun Oil Co., wholly owned subsidiary of Sun Oil Co. The latter signed agreements in Karachi with the government of Pakistan, June 8, 1957, for oil exploration rights on 10,000 square miles. The government will share 25% of initial exploratory and development expenses. Acreage, representing maximum available under the laws of Pakistan, is divided into five concessions—all located in the southern and southwestern portions of West Pakistan. The agreement is similar to that of Standard Vacuum, and calls for the customary 50-50 split of profits—with 25% of production found going to the government.

Standard Vacuum is now running two rigs, and has drilled five wells. Mari 1, was abandoned at 11,110 ft—with no shows. Mari 2, 60 miles south-southeast of the Sui gas field, reportedly had gas shows at 1,500 ft and again at 3,500 ft. The company's first well, Digh 1, was abandoned dry at 10,908 ft, November 7, 1956. Two more wells were spudded. Talhar 1 was abandoned—with no shows; depth unknown, but over 8,200 ft. The company is currently drilling Batoro 1, 75 miles east of Karachi. All these were in West Pakistan, although the company has concessions in East Pakistan as well.

Hunt International Petroleum Co. has drilled three dry holes. They were Dhak 1, abandoned at 8,404 ft; Dhak 2, abandoned at 14,614 ft after fishing jobs; and Sari Sing, bottomed at 10,166 ft, with some slight shows. The fourth well, Sunbak 1, was drilling 30 air-miles northeast of Sari Sing, as of the end of 1957. Good shows were reported between 2,000 ft and 4,000 ft, but these were not confirmed by the company.

Pakistan Shell Oil Co. (Royal Dutch-Shell group) will drill its first well by March. Location is near Kashmore.

Pakistan Petroleum Co. Ltd., subsidiary of Burmah Oil Co. (Pakistan Concessions) Ltd., discovered one of the world's largest gas fields at Sui, in 1952. This was followed by discovery of three more—two in West Pakistan, at Uch and Zin; and a third in East Pakistan, at Sylhet. During the first half of 1957, the company drilled Karachi 1 to 9,417 ft; Khairpur 2 to 11,670; and Adhi 1 to 2,089 ft. All were dry. At the end of 1957, three more wildcats were drilling—one at Lalmai in East Pakistan, and one at Bannh in West Pakistan. No shows were reported.

**Production:** Production during 1956 averaged 5,777 b/d. It is derived from four fields, of which the largest, Bakkassar, supplies in excess of two-thirds of the total.

Production from Bakkassar is from around 8,000 ft. There are about six flowing wells in the field, producing 26 API gravity crude from the Eocene. The other fields are Dhulian, discovered in 1937; Joyamair, discovered in 1944; and Khaur, now nearly depleted since its discovery in 1915. Crude production from the latter three is of 35, 22, and 37 API gravity, respectively.

Attock Oil Co. Ltd. reported in the 3d quarter of 1957 crude production in Pakistan of 394,277.8 bbl; while Pakistan Petroleum Ltd. reported 97,516 bbl. Total was 491,793,800 bbl.

**Transportation:** There are no crude pipelines of importance in the country. Sui gas line is 348 miles long, 16 in. in diameter, and has a capacity of 110 million cubic feet daily. It was constructed by Sui Gas Transmission Co. Ltd., which is owned 30% by the government's Industrial Development Corp. and 70% by Burmah Oil Co. Ltd., which will manage the line. A second 16-in. line is being built to Multan in the Punjab region. This line is wholly sponsored by the government's Industrial Development Corp., and will be completed in 1958. It will probably be extended 200 more miles to Lahore by 1960.

**Refining:** There is only one refinery in Pakistan—located at Rawahlpindi, in the Punjab. Capacity is 5,000 b/d, with 1,500 b/d of cracking capacity. The operator is the Attock Oil Co.

Plan for an oil refinery in Karachi will soon be submitted to the government by a consortium of four oil companies—including Burmah Oil, Shell Petroleum Co., Caltex, and Standard Vacuum Oil Co.

The government-sponsored Pakistan Industrial Development Corp. has announced that two fertilizer factories using natural gas will be built in Pakistan. One at Multan, in West Pakistan, will use gas from the Sui field; it will be built by ENSA, a French group of firms, at a cost of about £12 million, of which £9.8 million will be in foreign exchange. This plant will be completed by the end of 1960. The other will be at a site to be selected in East Pakistan, and will use Sylhet gas. It will be built by Kobe Steel Works of Japan, at a cost of £11.3 million, of which £8 million will be in foreign exchange. Plant will be completed early in 1961.

**Marketing:** Only about 20% of domestic consumption is produced locally; the remainder is imported. Consumption levels at present are averaging around 32,400 b/d, of which the largest segment is fuel oil. Consumption in 1960 is estimated to rise to 40,000 b/d.

## OIL LAWS

No changes occurred during 1957 in oil regulations as listed in the accompanying summary.

## NATIONAL FACTORS

No changes in the various national factors

**PAKISTAN—GEOLOGICAL AND GEOPHYSICAL (1956)**
(Party-Months)

Geophysical party-months (contract) totaled 90 in 1956—42 seismic; 48 gravity.

| | Standard Vacuum | Pakistan Petroleum Ltd. |
|---|---|---|
| **West Pakistan** | | |
| Geological surveys | 10 | |
| Gravity-meter | 12.5* | 4 |
| Reflection-seismograph† | 5** | 9 |

*1,743 miles of traverse. **1,175 miles of traverse. †Pakistan Oilfields (Attock) hed several reflection-seismograph parties during 1956.

| | Standard Vacuum | Pakistan Petroleum Ltd. |
|---|---|---|
| **East Pakistan** | | |
| Gravity | 10.5‡ | |
| Seismic | 8.5§ | 7 |

‡3,462 miles of traverse—nine party-months by helicopter. §637 miles of traverse—three party-months by helicopter.

**PAKISTAN—REFINERY OUTPUT OF OIL PRODUCTS**
(Thousands of Imperial Gallons)

| | 1956 | 1955 |
|---|---|---|
| Motor gasoline | 19,812 | 19,415 |
| Kerosine | 4,624 | 2,804 |
| Diesel oil | 14,992 | 13,985 |
| Fuel oil | 24,930 | 25,485 |
| Lubricants | 1,028 | 1,200 |
| Mineral turpentine | 172 | 209 |
| Solvent oil | 304 | 274 |
| Bitumen | 3,741 | |
| | 69,603 | |

Source: U. S. State Department, Karachi.

## Oil Law Summary★

**RECONNAISSANCE: Area:** 5,000 square miles. No limitation number of licenses per concessionaire, but maximum each wing (east and west) of Pakistan 10,000 square miles. **Duration:** 3 years. Renewable three times for 1 year each time. **Minimum Investment:** U. S. $1,050 per 100 square miles of area. **Annual Surface Tax:** U. S. $21.00 per 100 miles of licensed area.

**EXPLORATION (including drilling): Area:** 1000 square miles. Maximum 2,000 square miles in each wing of Pakistan. **Duration:** 4 years. One renewal of 1 year possible. **Minimum Investment:** U. S. $10,-500 for each 100 square miles of area. Reducible to half on geologically related areas under 50 square miles. **Annual Surface Tax:** U. S. $105 per square mile during original term. U. S. $210 during renewals.

**EXPLOITATION:** Conversion guaranteed. **Area:** Maximum 100 square miles. Limit 500 square miles in each wing of Pakistan. Two or more separate areas may be included in one concession, provided on same geological structure and not over 100 square miles in area. **Duration:** 30 years. May be renewed at government discretion for 30 years more. **Export:** Not permitted until domestic requirements met. **Employment:** Nationals must be employed at all levels. Minimum 50% nationals after 10 years. **Annual Surface Tax:** $420 per square mile. Doubled during renewals. **Annual Rental:** $420 per concession. Doubled during renewals. **Royalty:** 12½% on crude. Minimum 12.6 U. S. cents per barrel. Gas royalty the same. Yearly rentals deductible from royalties. Clause in concession calls for "periodic revision" of royalties. **Depletion Allowance:** 15% of gross, up to maximum 50% of net. Deduction of exploration and drilling expenses permitted.

★Source: *World Petroleum Legislation*, 604 Fifth Ave., N. Y. 20, N. Y. (see p's 37-38)

**PAKISTAN—SALES OF OIL PRODUCTS TO PAKISTAN AND AFGHANISTAN BY MAJOR MARKETING COMPANIES**
(Barrels of 42 U. S. Gallons)

| | 1956 |
|---|---|
| Motor gasoline | 1,343,126 |
| Aviation gasoline | 602,318 |
| Superior kerosine | 1,072,125 |
| Inferior kerosine | 486,696 |
| Jet fuel | 59,185 |
| Power kerosine | 24,297 |
| Diesel-gas oils | 1,883,617 |
| Industrial diesel oil | 1,095,863 |
| Furnace oil | 4,944,982 |
| Lubricating oils | 252,066 |
| | Pounds |
| Greases | 3,203,416 |
| | Short Tons |
| Asphalt | 15,709 |

Source: U. S. State Department, Karachi.

listed in *World Petroleum Report 1957* occurred during 1957. The government's attitude continued favorable toward foreign capital investment, with incentives given as previously described.

Political stability continued, and no detrimental acts such as expropriations occurred. The exchange rate for the rupee continued at 4.76 rupees per dollar, official rate. The rupee weakened during the year, and in March had hit a low of 7.61 per dollar at the unofficial or black-market rate.

Private US investment in Pakistan may receive the US government's guarantee against currency inconvertibility and expropriation. This does not apply to production enterprises.

Capital invested in petroleum after September 1, 1954, may be repatriated at any time thereafter to the extent of the original investment in the country from which the investment originated. These repatriation facilities are subject to exchange-control regulations.

Any part of the profits derived from investment and ploughed back into approved industrial projects with government approval may be treated as investment for repatriation.

The rate of normal tax on corporations is 31.25%. "Supertax" is 31.25% of total taxable income over $5,250. Reduction of the supertax is given to "public" companies.

There is little unionization of labor. There are no minimum wage laws. Average wages in the Karachi area range from 77 US cents per day for unskilled manual labor to 90 US cents per day for a semi-skilled machinist, and up to US $1.28 for a motor mechanic. Companies in oil exploration or production receive special treatment to effect equal division of profits between government and producer. This is after depletion allowance of 15% of gross up to 50% of net.

During 1957 a US Senate committee began consideration of a tax treaty with Pakistan. Pakistan law allows tax exemption for five years on profits up to 5% of invested capital. Dividends from such profits may also be tax-exempt. But US law, which allows a tax credit against US income taxes for taxes paid to a foreign country, would let the USA collect just about all the taxes Pakistan might waive. The bilateral treaty would allow a credit against US income taxes for a substantial sum of the taxes waived by Pakistan—in addition to the credit already allowed for taxes actually paid by American companies in Pakistan. END.

Pakistan
World Petroleum Report Concession Map
(Data as of Dec. 2, 1957)
AREAS GRANTED
1. MINING LEASES GRANTED TO ATTOCK OIL COMPANY LTD.
2. " " " " PAKISTAN PETROLEUM LTD.
3. PROSPECTING LICENCES GRANTED TO PAKISTAN OIL FIELDS LTD.
4. " " " " PAKISTAN PETROLEUM LTD.
5. " " " " STANDARD VACUUM OIL COMPANY
6. EXPLORATION LICENCES GRANTED TO PAKISTAN OILFIELDS LTD.
7. " " " " PAKISTAN PETROLEUM LTD.
8. " " " " STANDARD VACUUM OIL COMPANY.
9. " " " " HUNTS
10. " " " " PAKISTAN SHELL OIL COMPANY.
11. " " " " SUN OIL COMPANY.
AREAS APPLIED FOR
12. MINING LEASES.
13. EXPLORATION LICENCES.
14. PROSPECTING LICENCES.
AFGHANISTAN
IRAN
BHARAT
ARABIAN SEA
33°
34°
67°
68°
EAST PAKISTAN
BHARAT
BAY OF BENGAL

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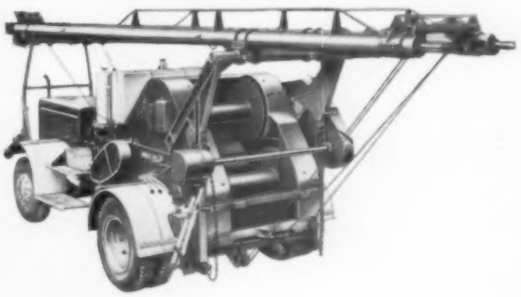
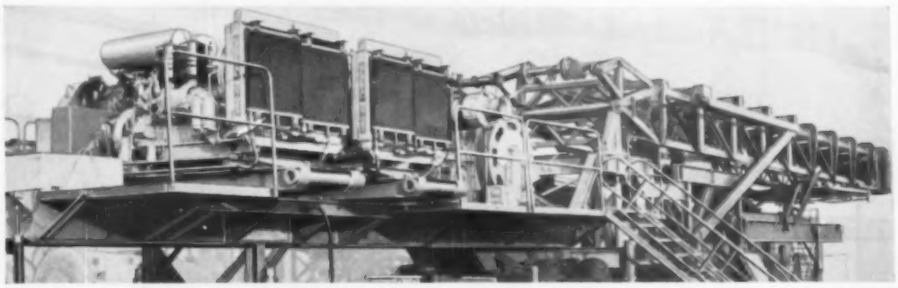


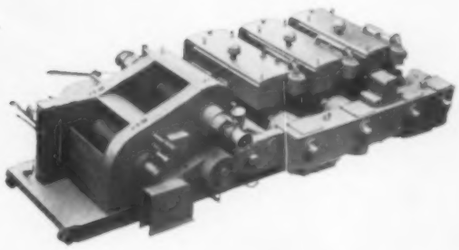


*Top illustration:*
*Woodfield "Fieldmaster" Mobile Well Servicing and Workover Rig. Well depths up to 4,000 ft.*

*Centre illustration:*
*WOODFIELD built IDECO Hydrair H-525 Dual Rambler drilling and servicing rig for wells 7,000/8,000 ft. depth. Drilling to 7,500 ft. with 4½" drill pipe.*

*Right illustration:*
*WOODFIELD built IDECO Hydrair H-40-D Double drum draw-works with 3 AEC engines, 450 H.P. and 4 shaft drive compound.*

*Lower right illustration:*
*WOODFIELD built IDECO H-20 double drum Well Servicing Rig. Well depth 3,000-4,000 ft.*



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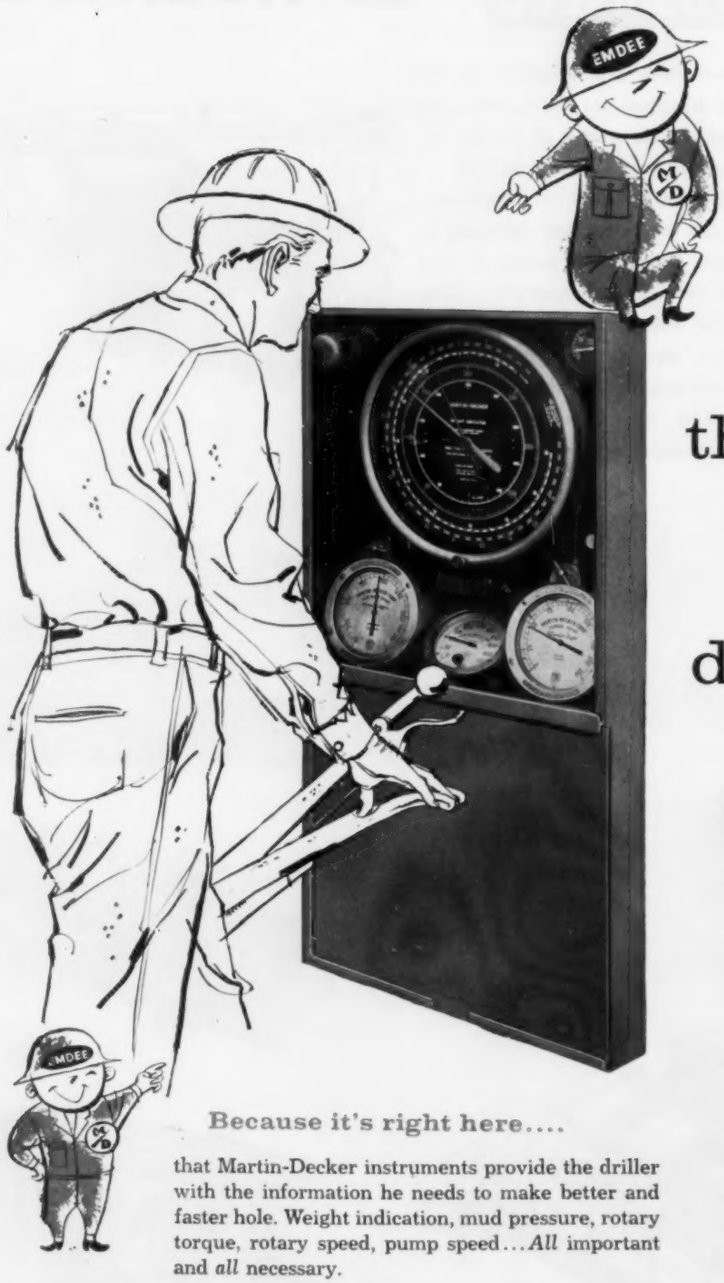


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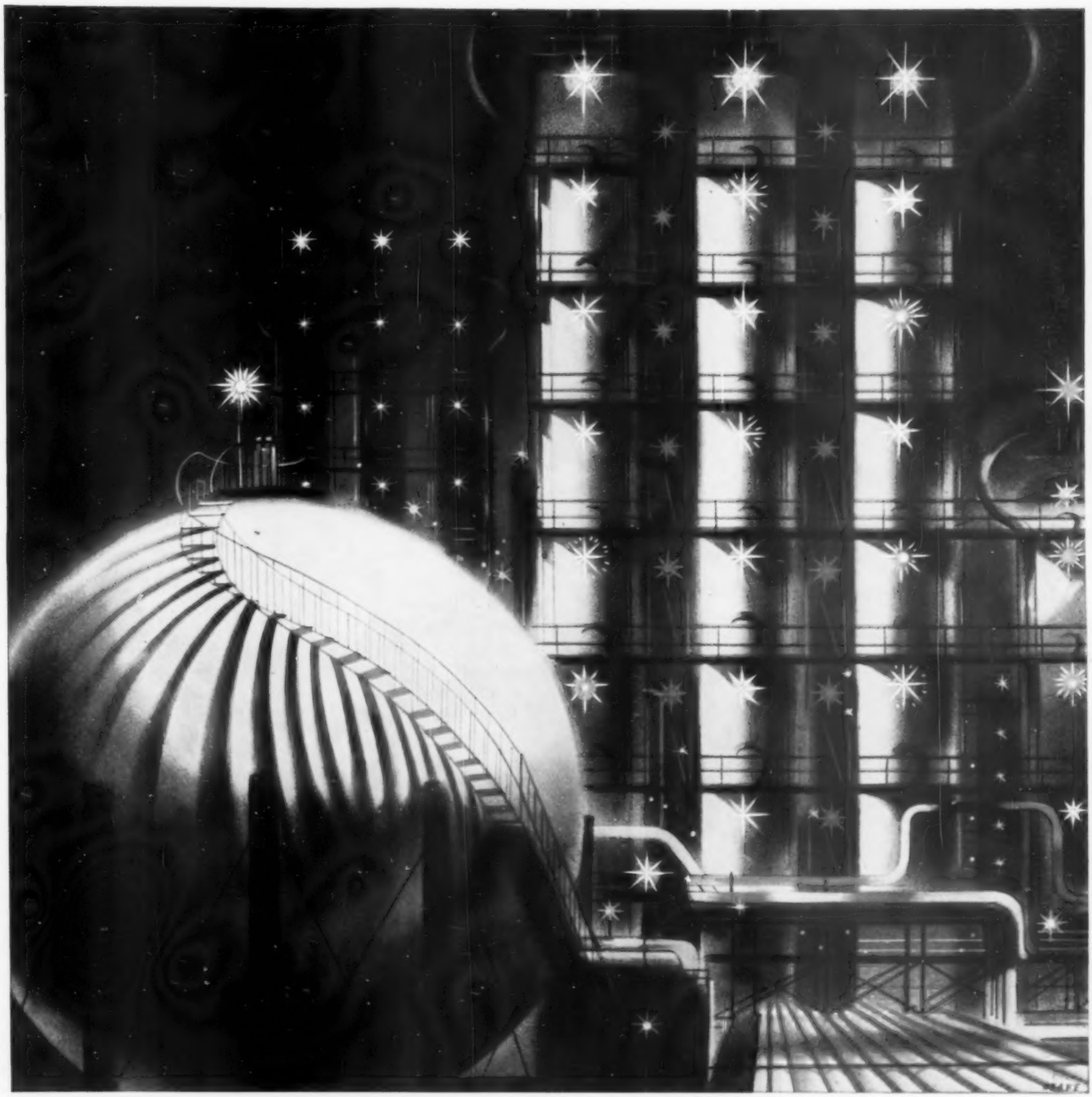

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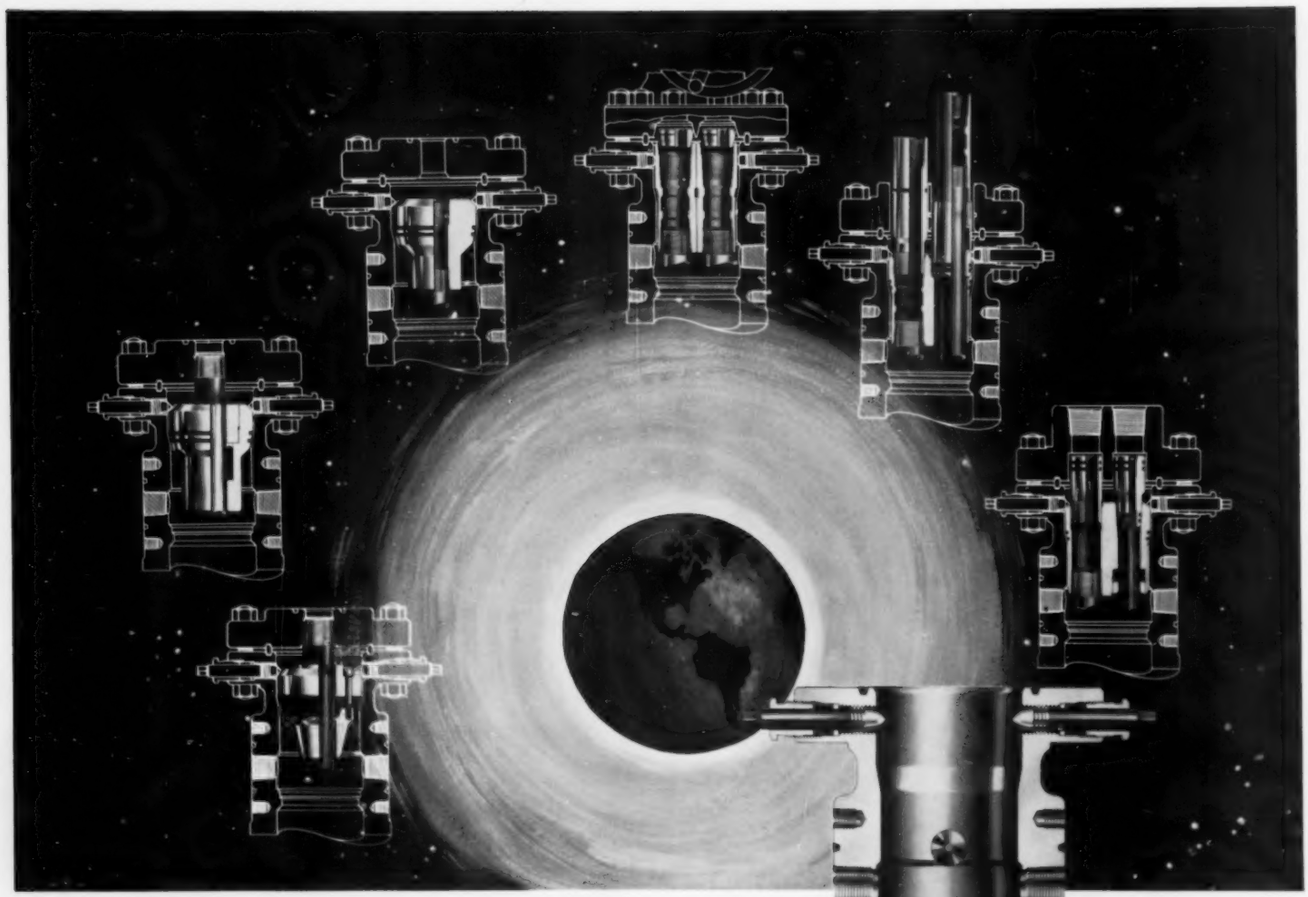

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